# MARINE REVIEW.

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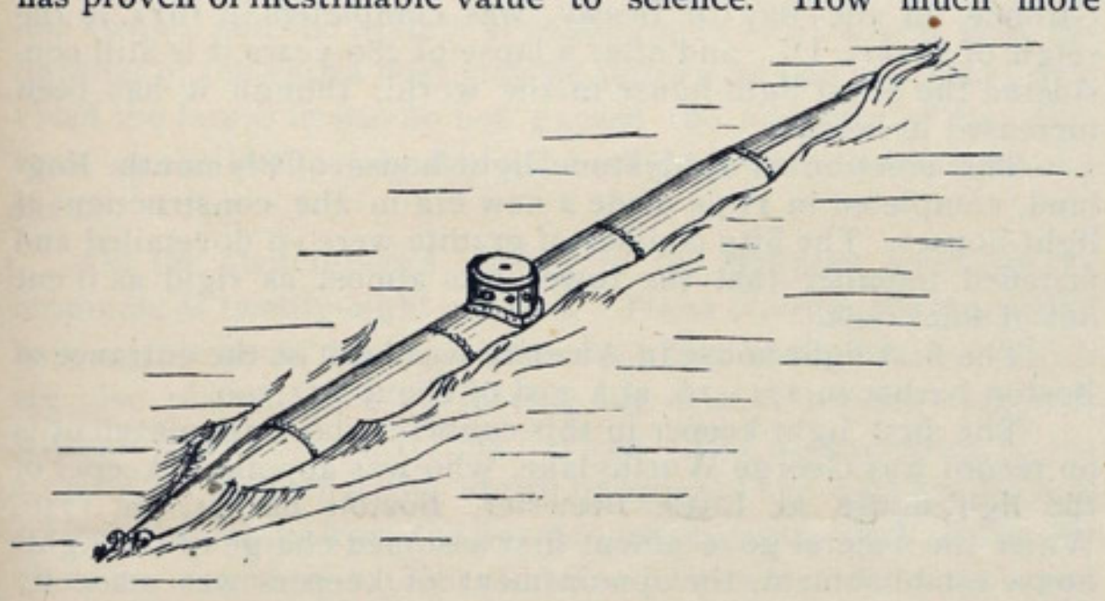
## The Raddatz Submarine Boat.

*By Richard Raddatz, the Inventor, of Oshkosh, Wis.*

Our knowledge of life and phenomena under the surface of the sea is very meager and is limited, for the most part, to observations made near the surface or in water less than 30 feet deep. In a few instances the observations have been extended to a depth of half a hundred feet, but our knowledge of what goes on beyond this depth is limited almost entirely to the knowledge gained by the Challenger expedition and other similar scientific researches, and to data collected by the navy departments of various nations from log books, these consisting mainly of soundings and dredgings. Many of these observers, and especially those working from the surface, labored under the great difficulty of seeing nothing below the surface, being obliged to draw conclusions from information derived from objects brought up by dredges, drag nets, etc., or from sounding rods and similar contrivances. But even under these comparatively disadvantageous circumstances, the information derived has proven of inestimable value to science. How much more



valuable, then, would be the results of observations actually made on the spot, which could be secured in a submarine boat supplied with sufficient light, not only to observe, but to photograph things as they are.

It is not hoped to reach with the submarine boat the profound depths reached by the sounding apparatus of the Challenger, but it is expected to go to greater depths than human beings have ever gone before, After a most thorough test before the launch of the shell of the ship here described, the inventor believes himself justified in saying that it is strong enough to resist the pressure to be met at a depth of 500 feet. In the vessel's construction every care was taken to have everything of the best possible material, with a high factor of safety, and the greatest possible care was exercised to avoid using in the ship any principle already in use or that has been tried in other submarine boats. The ship, therefore, operates upon entirely original principles. To further fit her for her scientific use, the ship was provided with a powerful search light, to aid in locating and photographing objects on the sea bottom. Air machinery of special construction was also provided to furnish air to the inmates. This apparatus is capable of maintaining air in the ship in a pure condition for a period of twenty-four hours if necessary. As the machinery is mostly automatic, one man can properly manage and steer the ship.

The boat is 50 feet long and 7½ feet high, and is made of $\frac{5}{16}$-inch steel plates, riveted to a very strong angle iron frame work, with double riveted seams. On the whole, the construction is as strong as it is possible to make it. At the stern is the propeller of 36 inches variable pitch, and just in front of this are the double vertical rudders. At the bow is a heavy spur about 3 feet long. At the top of the ship is a conning tower containing a water-tight manhead, eight windows commanding every point of the horizon. In this tower is the powerful search light, which, in waters of ordinary transparency, is capable of illuminating the path of the ship for some 500 feet ahead. The interior of the ship is brilliantly illuminated by special Edison incandescent lamps of low voltage operated by a battery of special accumulators, which are placed forward of the conning tower. This battery also furnishes current to operate other incandescent lights in different parts of the vessel, which are used to illuminate some particular machine or other apparatus. In the rear is the electric motor that operates the propeller and which, as well as the search light, is operated by a special battery, also placed forward of the conning tower and capable of delivering a current of 50 amperes at an E. M. F. of 150 volts. Under the conning tower are arranged the various alarms, gauges and indicators of the ship, and here are also placed, in easy reach of the pilot, the levers, switches, etc., controlling various machines in different parts of the vessel. The boat is well equipped with various other apparatus to facilitate observations.

A special photographic apparatus has been constructed, with which photographs of plant and animal life at the different depths, as well as any other object of interest that may be met with, can be made. The temperature of the water at the different depths will be observed and specimens thereof collected, which are to furnish information as to its composition. Currents will be charted and their velocity measured, and their temperature, and that of the adjacent waters observed, while specimens of the soil and deposits at the bottom will be collected.

While the ship is eminently suited for survey under water, she is equally well suited for naval purposes should it ever be found necessary or desirable to use her in such service. Although in her use as a submarine boat this vessel resembles other submarine craft, the resemblance in appearance is the extent of similarity. As a matter of fact, probably no two vessels are more unlike each other than the vessel here described and the boat invented by Mr. Baker. Several descriptive articles in different newspapers would lead one to think they were alike. The Raddatz ship is probably in no way more remarkable than in its entire dissimilarity in construction from other attempts towards successful submarine navigation.

## The Barge Company.

Capt. Alex. McDougall, who was in Cleveland, Wednesday, on his way west after a meeting in New York with the directors of the American Steel Barge Company, said that his consultation in the east had not resulted in anything of special importance relative to future operations of the barge company on the lakes. No new work was planned for the West Superior ship yard, but it was about settled that the boat at Everett, Wash., would be completed as soon as possible, so as to be turned over to the company that proposes to operate her in connection with the mid-winter fair at San Francisco. Work on the second ore dock at Duluth for the accommodation of the business of the Missabe mining syndicate will, he says, be pushed to completion, so as to double the ore shipping capacity of that port next season.

### Engines of the North America.

A supplementary engraving of the engines of the North America, one of the two twin-screw steel steamers being built by the Globe Iron Works Company, Cleveland, for the Northern Steamship Company, accompanies this issue of the REVIEW. The engraving was made from a photograph of the engines, which was taken a few days ago, just previous to their transfer from the machine shop to the ship yard. These engines are of the vertical quadruple type, to be worked in connection with twenty-eight water tube boilers, which are to be divided into three groups,—two of ten and one of eight generators. The nominal evaporative efficiency of the boilers will give to the main engines 7,000 horse power and to the auxiliaries 500 horse power more, with natural draught.

The sizes of the cylinders are 25 inches for the high, 36 inches for the first intermediate, 51½ inches for the second intermediate and 74 inches for the low pressure, with a stroke of 42 inches. Piston valves are used on all of the cylinders—one for the high, two for the first intermediate, two for the second intermediate and two for the low pressure, arranged outboard on the working side. All are operated by the Joy valve gear and reversed direct by steam and hydraulic gear. The reverse arms are slotted and are fitted with blocks and adjusting screws. The engine columns on the back or inboard side are of cast-iron, forked and of box section, and are braced together by cast-iron flanged distance pieces. The columns are fitted with detachable water-back guide faces. The front columns are of turned wrought iron, to which are attached by brackets the reverse shaft and link for the valve gear. The cylinders are without jackets or liners, and the valve chests are connected by faced joints and turned bolts. The L. P. and second I. P. cylinders are fitted with cone shaped, disk steel pistons, and the I. P. and H. P. cylinders have cast-iron pistons, all of which are fitted with followers and single ring packing, set out with flat bent springs. The piston rods are of steel, but do not extend through the top of cylinder head, and are secured to the piston head by quick taper and nut. The lower end is fitted with bolts and brasses that connect to pin in upper end of the connecting rod.

The cross-head, which is of the slipper pattern, of cast iron, is fitted with adjustable brasses and bolted to the piston rod. The connecting rod is re-forged iron, the lower end T shaped and fitted with brasses, lined with babbitt, and secured to the rod by bolts and plate. In the middle of the rod, jaws are forged on and slotted out to receive the brasses, to which is connected the vibrating lever of the valve gear. The upper end of the rod is forked and fitted with the steel pin that engages the cross head as already described.

The bed plate is of cast-iron in four sections, planed and bolted. The main journals in the bed plate are bored out and faced at end; brass bushes without flanges and babbitted are fitted top and bottom alike, and secured in place by cast-iron liners and bolts. The crank shaft is of wrought iron, built up in four duplicate interchangeable parts, 13½ inches diameter, and crank pin 14 inches diameter by 16 inches long. The crank shafts have solid forged couplings and are fitted with straight turned bolts. The total bearing in the bed plate is 10 feet 8 inches. The thrust block is of the horse-shoe type, with cast-iron shoes and faced with babbitt, the sole plate being bolted to the bed plate. Intermediate bearings lined with babbitt metal, are placed at proper intervals to support the intermediate shaft.

The propeller wheels are four bladed, sectional, 13 feet diameter and 18 feet pitch. The blades are of cast-iron and have an expanded pitch. The wheels are right and left and fitted to the tail shaft with taper, key and nut. The engines are fitted complete with relief valves at each end of the cylinders in receiver chest; and drain valves are fitted to the bottom of cylinders and valve chests, and arranged to be handled from the working platform. The air pump and condenser are detached from the main engine and are of the vertical compound and direct connected type; size of steam cylinders, 15 inches high pressure, 30 inches low pressure, by a stroke of 18 inches. The air pumps are single acting, 38 inches bore by an 18 inch stroke. The condenser is bolted on the side of the channel plate and is fitted with cone and spray nozzle, injection valve, etc. The feed pumps will be placed in the fire rooms. The cold water, bilge and sanitary pumps are of the vertical, duplex type and are located in the engine room.

The engines when turning 120 revolutions a minute will indicate 3,500 horse power each, and with a total horse power of 7,000 the vessel is expected to make an average speed of over 20 statute miles an hour.

### Light-Houses and their Keepers.

The following is from a paper by Edward P. Adams, read before the Boston Society of Civil Engineers. Much of it is condensed from Johnson's "The Modern Light-House Service," a publication of the United States light-house board.

The famous Pharos of Alexandria, built about 285 B. C., is the first light of undoubted record.

The light-house at Corunna, Spain, built in the reign of Trajan, and reconstructed in 1634, is believed to be the oldest existing light-house. England and France have towers which were erected and used as light-houses by the Roman conquerors.

The famous Cordovan tower of France, at the mouth of the Gironde, in the Bay of Biscay, was completed in 1611, in the reign of Henry IV,. and after a lapse of 280 years it is still considered the finest light-house in the world, though it has been increased in height.

The erection of Eddystone light-house of Plymouth, England, completed in 1759, made a new era in the construction of light-houses. The fifty courses of granite were so dovetailed and fastened together that the tower was almost as rigid as if cut out of solid rock.

The first light-house in America was built at the entrance of Boston harbor in 1715-16, at a cost of about $11,500.

The first light-keeper in this country whose appointment is on record was George Worthylake, who was appointed keeper of the light-house at Little Brewster, Boston harbor, in 1716. When the federal government first assumed charge of the light-house establishment, the appointment of keepers was made by the president, and quite a number of commissions bear the signature of George Washington.

The appointment of light-house keepers is restricted to persons between the ages of eighteen and fifty, who can read, write, and keep accounts; are able to do the required manual labor, to pull and sail a boat, and have enough mechanical ability to make the necessary minor repairs about the premises, and keep them painted, whitewashed, and in order. But one grade of keeper is recognized by law, but practically they are divided into a number of grades, with pay ranging, with few exceptions, from $350 to $820. The lowest salary is $100 and the highest is $1,000. At first and second order shore lights there are two light-keepers. A second assistant is required where there is a steam fog signal in connection with the light. At isolated stations another assistant is added. At a few of the most exposed stations there are three and even four assistant keepers

Keepers are usually appointed to the lowest grade and promoted or transferred according to merit as vacancies occur. At stations requiring but one keeper, retired sea captains who have families are frequently selected At fog signal stations it is the intention to have one keeper or assistant who is able to operate machinery and keep it in repair. Keepers are forbidden to engage in any business which will take them away from their stations or interfere with the proper and timely performance of their duties as light-keepers. But such work as curing fish, shoemaking, and tailoring is allowed, and the light-keeper is sometimes a justice of the peace. At stations where there is sufficient land they have a convenient dwelling with fuel house and often a barn. Suitable boats are furnished stations not accessible by land. A kitchen stove is supplied, also a little coal and sufficient kerosene for lights, and good libraries of about thirty volumes are furnished and exchanged from two to four times a year. The amount appropriated for the salaries of of keepers is at the rate of $600 per year, amounting to about $700,000 for all the keepers in the service.

### Three Sets of Direct Connected Engines and Dynamos.

In connection with the engraving and description in this issue of the engines of the North America, first of the Northern line passenger ships, some detail regarding the electric lighting equipment will undoubtedly prove interesting, as nothing like it has ever been attempted on the lakes. The plant, which is to be installed by the Fisher Electric Company of Detroit, is divided into three units, each consisting of a vertical, direct-connected, three cylinder, triple expansion engine and dynamo. The units are of 400 sixteen-candle-power light capacity each, and develop an E. M. F. of 110 volts at 300 revolutions per minute. A seperate condenser is supplied and connected to the electric lighting engines, suppressing entirely the noise occasioned by high pressure exhaust. The engines are of the double-acting, vertical type, the cylinders being cast in one piece and supported on eight steel columns, thoroughly braced. The valves are of the piston type, completely balanced. The main crank is cut from a solid forging and is supported in self-oiling journals, lined with gun metal, On one end of the triple expansion crank is forged a flange, to which is secured the armature shaft. The cross-heads, stubs and all moving parts of the engine are made of the highest grade of box metal. The engines are equipped with automatic relief valves and thoroughly protected with oil guards. The dynamos are of a multipolar type, the armature winding being so arranged that but two sets of brushes are necessary. Each dynamo terminates on a switch board in a main line switch, and the system of switching is so arranged that the lighting of the entire boat may be thrown on one machine—provided the lamps in use do not exceed the capacity of the dynamo—or the load can be divided eqally and automatically among them.

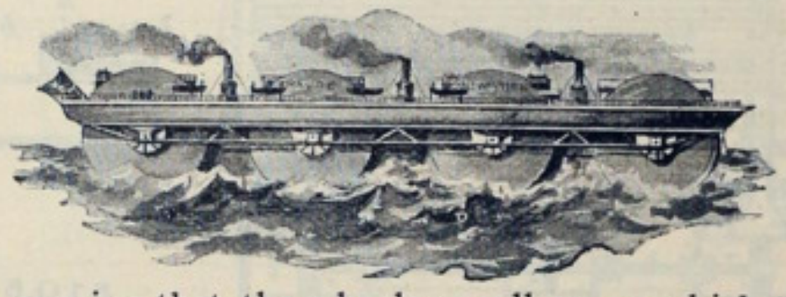
On the switch-board located in the dynamo room are the terminals of tweuty-eight circuits. These circuits are supported on a marble panel 3 feet 5 inches by 6 feet 10 inches, on which are also placed three am-meters and one volt-meter, together with all fuses and controlling devices. The arrangement of the circuits is such that the entire lighting of the boat can be controlled absolutely from the dynamo room, each deck being divided into from four to eight circuits. The electric company's core wire is employed throughout the entire installation, about 120,000 feet of wire and 60,000 feet of moulding being used in the work. The wiring scheme used by the United States navy is followed throughout the installation, employing but two sizes of wire—one size for mains and one for branches. The branches are taken from junction boxes, which form part of the fixtures, and a fusible cut-out is inserted in each pole of each branch. This practice not only secures absolute safety, but reduces complications and simplifies the system of fusing, two sizes only being used—one diameter of fuses for branches and a larger diameter for mains. All wires are enclosed in heavy mouldings, which are secured by machine screws to the steel decks. A separate hole is drilled in the steel beams for each wire, and the holes bushed with heavy rubber tubes. With this method, the moulding is entirely protected from mechanical injury and will not warp out of shape.

The state rooms are lighted by sixteen-candle-power lamps, enclosed in ground glass globes, and these lamps are lighted and extingnished by a switch placed adjacent to the birth. The main saloon is lighted by means of beautiful clusters, and in each panel running parallel with the state rooms is placed a sixteen-candle-power lamp, enclosed in a ground glass globe. This same mode of lighting is followed in other departments, but the style of fixtures is, of course, somewhat varied. Particular attention has been given to lighting the boiler room and the immense quadruple engines used to drive the boat. A commendable feature in this installation is the location of the electric lighting plant entirely apart from the engine room. The dynamo room is located forward, just aft of the immigrants' quarters, and occupies a place entirely by itself.

The boat will be equipped with electric signal lights of 100 candle-power each, connected to an automatic alarm attachment, located in the pilot house. In case a lamp is extinguished by accident or otherwise, it rings an alarm bell in the pilot house and also lights a lamp,notifying the officers in charge immediate'y that a lamp has been extinguished. Each state room is connected to the clerk's office by means of an electric bell, the buttons for which are placed adjacent to the berths, and passengers can obtain anything that is usually found in a first-class hotel.

### A French Inventor's Boat.

In these days of revolutionary projects in matters mechanical and scientific, unusual engineering exploits have lost much of their tendency to create surprise. Still that sensation may be produced in a mild degree by the latest scheme of ocean transportation which has reached us from France and which has M. Bazin, not unknown in engineering circles, for its author. M. Bazin proposes, in brief, to build an Atlantic liner on eight rollers with the view of securing speed much higher than any thus far



attained, arguing that the wheels or rollers on which the vessel is to rest will so greatly diminish the resistance offered by the waves that thirty knots an hour will be easily within the bounds of possibility and will enable the passage from Southhampton or Liverpool to New York to be made in four days. The rollers are to enter the water to the depth of 26 feet and revolve within a platform placed about 24 feet above the water, so that there will be a rolling instead of a gliding body as is the case in ordinary ships. The rollers presumably are to be worked by engines to secure propulsion. M. Bazin claims to have settled by experiment that the stability of the roller type of vessel is at least as great as that of the ordinary type, and believes that the construction of his design of ship will be much less costly than that of the usual description. According to French report, it is proposed to put M. Bazin's plans to a practical test by constructing a vessel about 400 feet long and of about 90-foot beam, with rollers 75 feet in diameter and 35 feet wide. The latter are to make twenty-two revolutions a minute.—Cassier's Magazine.

### In General.

Naval officers are trying to solve the interesting problem as to whether a man could live in a submarine boat if an explosion, or several explosions, should occur near him away down below the surface of the sea. A Lay torpedo boat, to be submerged some twelve feet, will be experimented with for the purpose, and gun cotton will be detonated around it until it collapses or gives evidence as to how much it can stand.

A great many publications reviewing the World's Columbian Exposition are now being sold throughout the country, and many of them are meritorious on account of the views which they contain, but we have seen none that equal the "Book of the Fair," published by the Bancroft company, Auditorium building, Chicago. Several of the twenty-five parts of this work have already appeared and each seems to outstrip its predecessor in the matter of excellent engravings.

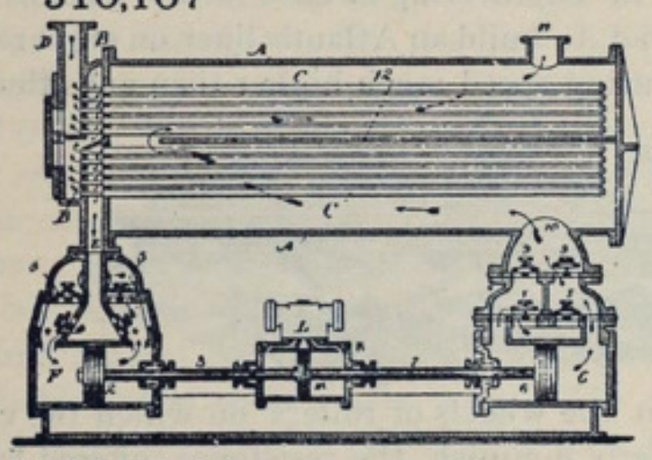
A despatch from Wiscasset, Me., makes the claim that representatives of the American Steel Barge Company are considering the advisability of establishing a ship building plant at that point, for the purpose of constructing whaleback steamers for the Atlantic seaboard, West Indies and South American trades. As it was proposed last season to bring to the lakes the two whalebacks that are now on the Atlantic coast, on account of a depression in the coasting business, and as the ship yard at West Superior is idle in all departments, it is not probable that there is much truth in this report.

## Record of Marine Patents.

**510,107. CONDENSING APPARATUS, Frederick M. Wheeler, Montclair, N. J. Filed March 16, 1892. Serial No. 425,107. (No model.)**

Claim: First, the combination with a direct acting steam engine of two pumps driven by such engine and having ports and valve chests above the cylinders, a surface condenser having pipes opening into a chamber at one end, which chamber is directly connected to the valve chest of one pump and the casing of such condenser having an opening into the valve chest of the other pump substantially as specified. Second, the combination with a horizontal surface condenser, of a water circulating pump beneath one end of the condenser and an air pump beneath the other end of the condenser, such pumps being provided with the valves and the ports thereof opening directly into the condensing water space of the condenser and to the space for the steam and water of condensation respectively, and an intermediate direct acting steam engine connected to the piston rods of the respective pumps. Third, the combination with a surface condenser having tubes opening into a chamber at one end, of two pumps beneath the condenser and upon which said condenser is directly supported, the case of the condenser opening into the valve chamber of one pump and the end chamber of the condenser opening into the valve chest of the other pump and an actuating steam engine between the pumps and directly connected with them.

510,107



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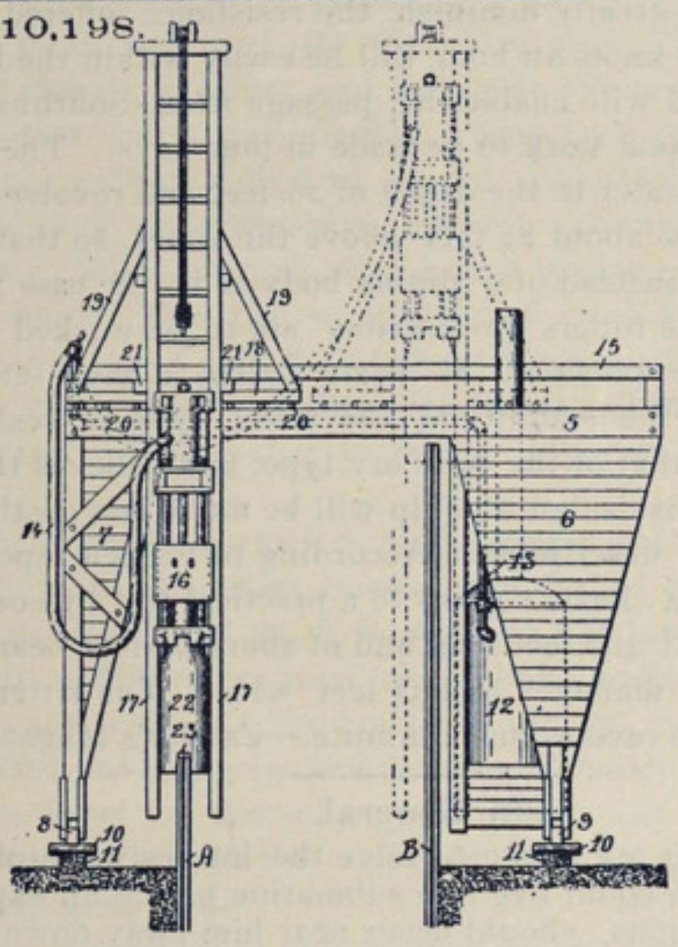

**510,198. PILE-DRIVER. Frederick E. Shaw, Providence, R. I. Filed Aug. 24, 1893. Serial No. 483,977. (No model.)**

Claim: First, in a sheathing pile driver, the combination with a bridge frame work longitudinally movable on tracks, or ways, of a platform transversely movable on said bridge, vertical guides secured to the platform, a pile driving device movable between said guides, a guard rail, and mechanism secured to the platform and extending beneath said guard rail. Second, the combination with a bridge frame work having a transverse track, or way, the guard rail 15, and side supports 6 and 7 for supporting the same, of the platform 18 the rolls 20, on which the platform is movable, the vertical guides 17 17 secured to the platform, a pile driving device mounted between the guides, and beams 21 21 secured to the platform and extending beneath the guard rail, as and for the purpose described.

**510,373. SURFACE CONDENSER. Frederick M. Wheeler, Montclair, N. J., and Clifton H. Wheeler, Flatbush, N. Y., assignors to the Wheeler Condenser and Engineering Company, Montclair, N. J. Filed Feb. 13, 1893. Serial No. 462,022. (No model.)**

Claim: The combination with the condenser heads, of tubes passing through such heads, each tube having an enlarged screw thread around one end and means adjacent to the screw thread for rotating the same whereby such tube is screwed into the screw-threaded hole for permanently connecting such tube with one head, the smooth and free portion of the tube at the other end being within the opposite head, and a packing surrounding this end of the tube, and means for compressing the same around the tube, substantially as set forth.

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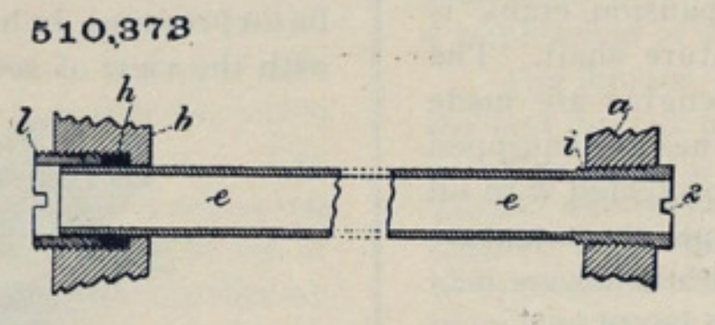

**510,591. SUCTION-PIPE FOR DREDGERS. William J. Dyer, Honolulu, Hawaii, assignor to the Risdon Iron and Locomotive Works, San Francisco, Cal. Filed Sept. 21, 1892. Serial No. 446,370. (No model.)**

Claim: First, the combination with the main suction pipe of a dredger, of an auxiliary suction pipe suspended therefrom and having a flexible part or section, substantially as set forth. Second, the combination with the main suction pipe of a dredger, of an auxiliary suction pipe suspended therefrom, an l having a flexible part or section provided with an inlet mouth piece, and having its discharge end connected to the main suction pipe. Third, the combination with the main suction pipe of a dredger of an auxiliary suction pipe having a flexible part or section and having a mouth piece provided with projecting teeth. Fourth, in combination with the flexibly connected suction pipe of a dredger and a weighted line M extending from the lower end of said pipe to serve as an indicator.

**510,713. APPARATUS FO REMOVING HARBOR AND RIVER BARS AND SHOALS AND PREVENTING THE FORMATION OF THE SAME. Robert M. Scott, Balmain, near Sydney, New South Wales. Filed Dec. 9, 1891. Serial No. 414,509. (No model.)**

Claim: First, the combination of a submerged system of stationary water pipes, a plurality of nozzles arranged along each pipe and all slanting towards one end thereof, together with a water forcing apparatus connected with said system, substantially as described, Second, the combination of a submerged

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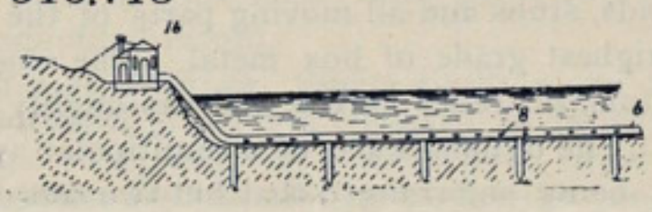

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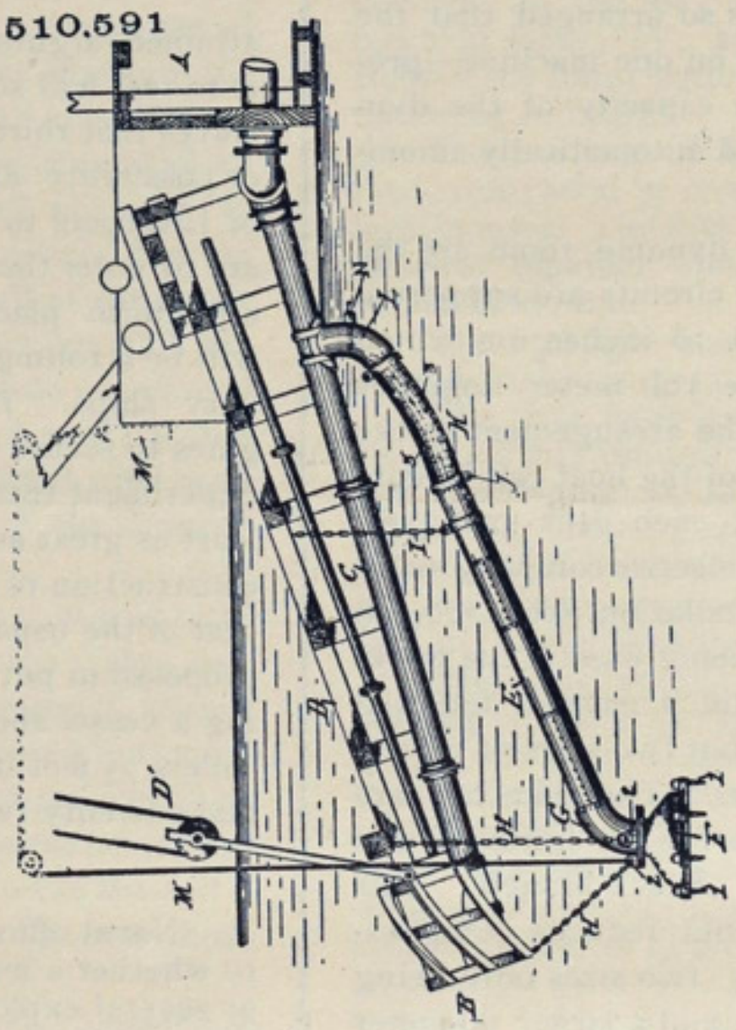

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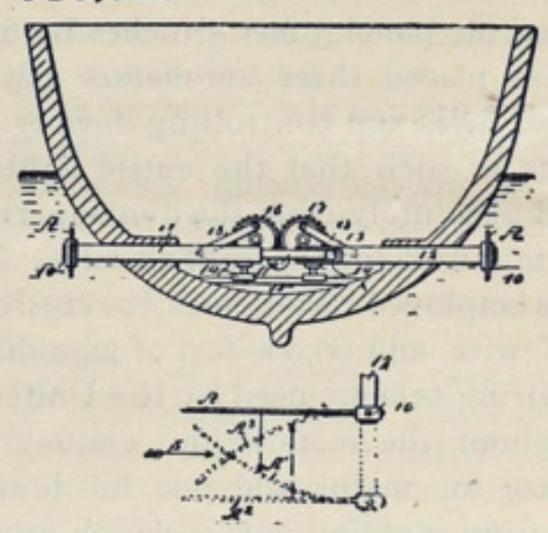

pipe, one or more sleepers for said pipe, a perforated casting on the bottom of the sleeper, a pipe connected with said casting and a water forcing apparatus connected with said pipe.

**510,725. PROPELLING MECHANISM FOR VESSELS- Frank Taff, Whitestone, N. Y. Filed April 7, 1893. Serial No. 469,430. (No model.)**

Claim: First, a propeller for vessels consisting of a blade or fin made flexible and elastic in its length, combined with and rigidly attached to a shaft or support, and guiding and actuating devices for moving the fin bodily at right angles to its plane. Second, a propeller for vessels consisting of a blade or fin made flexible and elastic in its length; combined with and rigidly attached to a shaft or support at right angles, and guiding and actuating devices for reciprocating the fin bodily in a plane at right angles to the blade. Third, a propeller for vessels consisting of two elastic blades or fins arranged parallel to the longitudinal axis of the vessel on opposite sides of the same, two corresponding shafts rigidly attached to the blades and arranged transversely to the vessel to reciprocate through the sides of the same, and means for imparting an opposite or reverse movement to the shafts to cause the lateral thrust of one blade to neutralize the lateral thrust of the other to relieve the vessel of a tendency to tremble; also two reciprocating shafts rigidly attached to the blades, arranged transversely in the sides of the vessel, and having a sliding connection with each other at their inner ends, and gear wheels and pitmen arranged to impart a reversed reciprocating motion to the two shafts and blades.

## Minimum Freight Rates—Ore Tariff.

As the meeting of vessel owners in Cleveland, Wednesday, called upon the arrival of Capt Alex. McDougall, was the largest that has been held in any lake port since the last annual meeting of the Lake Carriers' Association, and as the principal topic under consideration had reference to the adoption of some plan for overcoming ruinous competition in freights next season, it is now certain that the subject of minimum freight rates, or a freight agreement of some kind, will be brought up at the annual meeting of the lake carriers in Detroit next month. Messrs. Harvey H. Brown, W. D. Rees, James Corrigan, H. G. Dalton and J. H. Sheadle, who represent firms that are shippers as well as vessel owners, were in attendance at the meeting and took part in the deliberations. Opinions from these gentlemeu, as well as other shippers in Cleveland who were not in attendance at the meeting, prove conclusively that shippers of ore and soft coal as a rule would lend assistance to any plan that would tend to cause stability in rates within reasonable bounds, but the whole question is, of course, so complicated that there is only the hope of some good coming from the present agitation. The different phases of the subject were talked over, as they have been several times in the past. Mr. Rees advanced a new idea in suggesting the possibility of securing from all of the ore shippers an agreement not to engage any vessels for cargoes next season before May 15. Capt. McDougall did not commit himself very freely, although his comments left the impression that his company would join in any agreement that might appear practicable. The matter was left in the hands of a committee of seven vessel owners and shippers, who are expected to present plans to the annual meeting of the Lake Carriers' Association.

Capt. McDougall's principal mission was to enlist support tor the big project of improving Duluth and Superior harbors, which has been undertaken jointly by the two cities. It is proposed to secure, if possible, in the next river and harbor bill, a clause providing for the digging out of practically the entire basin, which forms the harbors of Duluth and Superior, to a depth corresponding with the 20-foot channel. The aim of the people at the head of the lakes is also to have this work provided for by the continuous contract system. The scheme is a big one, but Capt. McDougall enlisted considerable support for it by his visit to Cleveland, and more will be heard of it in the future.

Although the Lake Carriers' Association has taken no part in the opposition to removal of the tariff on ore, in order to avoid any possibility of being charged with meddling in political matters, the vessel owners assembled at this meeting decided to join the ore interests of other parts of the country in the fight that will begin shortly in both houses of Congress, and a committee was appointed to provide funds for sending representatives to Washington.

## Gasoline Engines for Steamers.

A large class of steamers engaged in coasting, ferry or river trade could use gasoline engines to advantage and thereby effect a saving in a number of ways. There is no coal or wood to be carried, but simply a barrel or tank full of gasoline; no license is required for captain, engineer or pilot, and these advantages with an actual economy in fuel all combine to render the use of this type of engine very desirable. In the ship building report in this issue it will be noticed that there are two boats of considerable size, one on the Atlantic and one on the Pacific, to be equipped with this class of engine. The Van Duzen Gas and Gasoline Engine Company, No. 208 E. Third street, Cincinnati, O., will furnish particulars.

## Around the Lakes.

Capt. Jas. S. Corbin, an old lake master, died at his home in Saginaw on Thursday last.

Capt. M. C. Frawley, seventy-seven years of age, who sailed seagoing and lake vessels when a young man, but who had been connected with the Cleveland Rolling Mill Company for twenty-eight years, died at his home in Cleveland Tuesday.

A. B. Wolvin of La Salle & Wolvin of Duluth, Capt. James Davidson of West Bay City, Capt. Alex. McDougall of Duluth, and H. B. Bell, who is in charge of Marquette ore docks, were among visitors in Cleveland during the week.

What will you buy your lake-faring friend—father, brother, uncle—for Christmas that will please him any better than a copy of phototypes of lake steamers. Send 50 cents to the MARINE REVIEW, Cleveland, O., and the engravings will be forwarded by mail.

## Some Average Lake Freight Rates.

In the accompanying tables there is presented average rates of freight on iron ore, soft coal and grain. The averages of daily rates, or rates on wild cargoes, is made up by collecting from several shippers and vessel brokers their lists of charters during the season, from which a general list is prepared, that will include in nearly all cases actual charters for every day of the season. The sum of these daily rates divided by number of days gives the average quoted. These averages are, then, what may be termed daily averages, and not, as regards ore and coal, which are largely covered by season contracts, the figures at which the entire tonnage of either of these commodities was moved.

The great bulk of the ore moved from the head of Lake Superior, as well as Marquette, during the past season was covered by freight contracts, but from Escanaba there was only one contract for the full season, that made by Milwaukee vessel owners with the Pewabic Mining Company. It will thus be readily seen that the average daily rates from Marquette and the head of Lake Superior are far from representing the rate at which the entire shipments from either of these points were moved by water. With this point in view, the REVIEW secured from all shippers who moved ore from the head of the lakes—Two Harbors, Ashland and Duluth—the average rate in the case of each shipper on both contract and wild ore, as well as the several amounts shipped. From these figures it was found that the average freight rate by water on all ore moved from the head of Lake Superior during 1893 was 94.1 cents. Following are the tables:

AVERAGE FREIGHT RATES, IRON ORE, PORTS NAMED TO OHIO PORTS.

| Year. | ESCANABA. | | MARQUETTE. | | ASHLAND AND OTHER PORTS AT THE HEAD OF LAKE SUPERIOR. | |
|---|---|---|---|---|---|---|
| | Wild or daily rate. | Contract rate. | Wild or daily rate. | Contract rate. | Wild or daily rate. | Contract rate. |
| 1874 | $1 36 | $2 00 | $1 93 | $2 75 | ..... | ..... |
| 1875 | 1 13 | 1 40 | 1 50 | 1 75 | ..... | ..... |
| 1876 | 86 | 1 20 | 1 35 | 1 50 | ..... | ..... |
| 1877 | 98 | 1 00 | 1 41 | 1 40 | ..... | ..... |
| 1878 | 81 | 90 | 1 22 | 1 30 | ..... | ..... |
| 1879 | 1 25 | 90 | 1 83 | 1 40 | ..... | ..... |
| 1880 | 1 70 | 1 85 | 2 26 | 2 75 | ..... | ..... |
| 1881 | 1 36 | 1 75 | 2 05 | 2 45 | ..... | ..... |
| 1882 | 1 04 | 1 40 | 1 26 | 1 75 | ..... | ..... |
| 1883 | 1 22 | 1 00 | 1 40 | 1 20 | ..... | ..... |
| 1884 | 87 | 1 10 | 1 08 | 1 35 | ..... | ..... |
| 1885 | 78 | 90 | 98 | 1 05 | $1 25 | $1 15 |
| 1886 | 1 28 | 1 05 | 1 51 | 1 20 | 1 78 | 1 20 |
| 1887 | 1 59 | 1 40 | 1 87 | 1 63 | 2 23 | 2 00 |
| 1888 | 1 05 | 90 | 1 30 | 1 15 | 1 43 | 1 25 |
| 1889 | 1 01 | 1 00 | 1 19 | 1 10 | 1 34 | 1 25 |
| 1890 | 89 | 1 10 | 1 07 | 1 25 | 1 17 | 1 35 |
| 1891 | 84 | 65 | 1 02 | 90 | 1 11 | 1 00 |
| 1892 | 74 | 1 00 | 98 | 1 15 | 1 15 | 1 25 |
| 1893 | 56 | 85 | 71 | 1 00 | 77 | 1 00 |

[Charge to vessel for handling ore, 19½ cents.]

Average ore rates for the entire period of twenty years: Escanaba, contract $1.17, wild $1.07; Marquette, contract $1.50, wild $1.40. Average for past ten years: Escanaba, contract 99½ cents, wild 96 cents; Marquette, contract $1.18, wild $1.17. Ashland averages for nine years are $1.27 contract and $1.36 wild.

AVERAGE DAILY WILD RATES, SOFT COAL, OHIO PORTS TO PORTS NAMED.

| Year. | Milwaukee. | Escanaba. | Duluth. | Green Bay. | Manitowoc. |
|---|---|---|---|---|---|
| 1885 | $0 63 | $0 51 | $0 49 | ..... | ..... |
| 1886 | 83 | 60 | 78 | ..... | ..... |
| 1887 | 1 06 | 72 | 89 | ..... | ..... |
| 1888 | 84 | 61 | 66 | ..... | ..... |
| 1889 | 54 | 49 | 52 | ..... | ..... |
| 1890 | 64 | 45 | 49 | ..... | ..... |
| 1891 | 61 | 52 | 49 | ..... | ..... |
| 1892 | 58 | 43 | 43 | $0 55 | $0 49 |
| 1893 | 48 | 40 | 38 | 50 | 41 |
| Average nine years, | 69 | 53 | 57 | | |

(Coal shipped, net tons; handled without charge to vessel.)

AVERAGE DAILY RATES OF FREIGHT, GRAIN, CHICAGO TO BUFFALO.

| Year. | Wheat. | Year. | Wheat. |
|---|---|---|---|
| 1878 | 3.1 cents. | 1887 | 4.1 cents. |
| 1879 | 4.7 " | 1888 | 2.7 " |
| 1880 | 5.7 " | 1889 | 2.5 " |
| 1881 | 3.2 " | 1890 | 1.9 " |
| 1882 | 2.5 " | 1891 | 2.5 " |
| 1883 | 3.5 " | 1892 | 2.2 " |
| 1884 | 2.1 " | 1893 | 1.8 " |
| 1885 | 2. " | | |
| 1886 | 3.6 " | Average sixteen years... | 3 cents. |

[Handling charge to vessels on grain, $3.50 to $4.00 per 1,000 bushels.]

# MARINE REVIEW.

*DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.*

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ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

| | St. Mary's Falls Canal. | | | Suez Canal. | | |
|---|---|---|---|---|---|---|
| | 1892. | 1891. | 1890. | 1892. | 1891. | 1890. |
| No. vessel passages | 12,580 | 10,191 | 10,557 | 3,559 | 4,207 | 3,389 |
| Ton'ge, net regist'd | 10,647,203 | 8,400,685 | 8,454,435 | 7,712,028 | 8,698,777 | 6,890,014 |
| Days of navigation.. | 223 | 225 | 228 | 365 | 365 | 365 |

*Entered at Cleveland Post Office as Second-class Mail Matter.*

ANOTHER ship canal promoter, A. R. Sutton, who is said to be an engineer and capitalist of Chicago, is in Washington endeavoring to enlist support for a company which, he says, is ready to undertake the great task of securing charters from both the Canadian and United States governments for canals from Thorold, Ont., on the Welland, to Niagara river below the rapids, and from the St. Lawrence through Lake Champlain to Troy or Albany on the Hudson. Many fertile brains have been brought into play in the selection of routes for a waterway from the lakes to the seaboard, and this one is not without its share of originality, but the ideas of Mr. Sutton relative to the formation of a private company for carrying out a project of such magnitude show a lack of practical business experience. The financial problem involved is an obstacle to anyone excepting the general government undertaking such a work.

ONE of the Merritts, controlling owners of the principal iron mining properties on the Missabe range, is quoted as saying that the agitation against tariff changes is hurting business, and that anyhow the Missabe mine owners care little about the removal of the tariff on iron ore, as they can compete with any mining region in the world. This is certainly a very short-sighted view of a broad question. Suppose the vessel interests of the lakes, with a selfish and narrow view of the iron business as a whole, should urge the removal of the tariff, on the grounds that free ore would develop the vast iron lands of Canada tributary to the head of the lakes, and that they would have the ore to carry, tariff or no tariff, as Canada has practically no vessels suited for such service. The Missabe might find a competitor in the Canadian territory.

ABOUT 7,500,000 barrels of flour were shipped from Duluth and Superior during the past season, and if the manufacture of flour at the head of the lakes is continued for the balance of the crop year on the basis that has been maintained for some time past, more wheat will have been ground into flour at the new mills than has ever before been received at Duluth in a single season. This seems like a very broad statement but it is made on the authority of a Duluth vessel broker who is very well posted on the grain and flour business of the lakes. A line of boats, composed of such big steamers as the Centurion, Gratwick, Selwyn Eddy and Gilbert, will be engaged exclusively in this trade next season. The flour business is certain to have an important bearing on Lake Superior trade of the future.

ALTHOUGH the differences are not great, the statistical reports for the present month show an increase in pig iron production and a decrease in stocks. To a moderate extent, then, there is cause for reporting some improvement in the iron market, upon which the business of the lakes will be so largely dependent next year. On Dec. 1 the weekly capacity of all iron furnaces was 19,309 tons greater than on Nov. 1, and the stocks of coke pig iron were reduced 18,514 tons during November, as against a reduction of 28,351 tons in October. The production of pig iron in 1893 (December estimated) is some 2,000,000 tons less than 1892 and the smallest since 1888, when the make was 6,489,738 tons.

UNTIL there is some settlement of the question of a general readjustment of charges connected with the mining and transportation of iron ore for next season, little may be expected in the way of sales or negotiations in lake freights. Royalties, rail freights from mines to shipping ports and handling charges at lower lake ports, as well as trimming charges to vessels, are all out of proportion with the prices at which there is any possibility of the product of most of the mines being sold. The labor cost of mining has already dropped to a low basis, and even the ore sales agents may be forced to grant further concessions in the matter of commissions. The vessel owners, with whom a future of low freights is taken as a foregone conclusion, must undertake a more economic policy, and along the whole line of lake business retrenchment is looked for.

THE full report of the board of army engineers appointed to investigate raft towing on the lakes, which was submitted to Congress a few days ago by the secretary of war, makes a most interesting pamphlet. It is entitled Executive Document No. 22, Fifty-third Congress, and can be secured through any of the representatives. The conclusions of the engineers are entirely favorable to the vessel interests, and it would seem that the representatives of the rafting business will be encouraging legislation that will put them to great inconvenience if they do not join the vessel owners in preparing as soon as possible, a compromise measure for submission to Congress.

IT is announced that there will be located at Detroit shortly a gas compressing plant, at which gas storing reservoirs will be charged for use in lighting passenger trains on the Michigan Central and Grand Trunk railways. The Pintsch system, the same as that applied to gas buoys, will be used, and now that there will be no difficulty in securing compressed gas for these buoys in the immediate vicinity of the Detroit and St. Clair rivers, it is to be hoped that the light-house board will consign a few of them to such points in the rivers as are most in need of good marks.

ALL reports of naval officers and builders of war vessels go to show that in the few years since the construction of the new navy was begun the cost of building a vessel in the United States has fallen 33⅓ per cent. With the advantages steadily accruing to our builders there is every reason to expect that in a few years more the cost of production will closely approximate that of foreign builders.

## Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store at the principal points of accumulation on the lakes on Dec. 16, 1893:

| | Wheat, bu. | Corn, bu. |
|---|---|---|
| Chicago | 19,378,000 | 1,905,000 |
| Duluth | 8,776,000 | ..... |
| Milwaukee | 856,000 | ..... |
| Detroit | 1,674,000 | 9,000 |
| Toledo | 2,579,000 | 478,000 |
| Buffalo | 3,361,000 | 821,000 |
| Total | 36,624,000 | 3,213,000 |

At the points named there is a net increase for the week of 515,000 bushels of wheat and 431,000 bushels of corn.

## NEXT SEASON'S NEW TONNAGE.

REPORTS OF SHIP BUILDING IN PROGRESS IN LAKE, COAST AND RIVER YARDS—NEW FREIGHT TONNAGE WILL NOT MATERIALLY INCREASE THE CARRYING CAPCITY OF THE LAKE FLEET.

The table below shows that there is under contract in lake ship yards at present twenty-eight vessels, having a carrying capacity of 26,400 gross tons and a valuation of $2,538,500. By comparison with the table showing building operations for seven years previous it will be seen that the tonnage is less than half and the valuation but little more than half that shown in any year during that time. This condition of affairs will probably be improved by contracts which will be let during the spring months, but of which nothing can be said at present. It is quite probable that negotiations now pending will result later on in contracts for four or five steamers of about 2,500 tons capacity each and a valuation of $225,000 each. These spring orders, if placed, as a result of plans dependent upon a slight improvement in business, will redeem the ship building industry on the lakes from what appears to be an unprofitable season. It will be noticed that wooden ship building which has been eclipsed completely by the steel work for several seasons, makes a creditable showing. The probable reason for this is that builders having timber can now procure labor so cheaply that they can afford to build on their own account and hold the boats until freights return to a profitable basis.

VESSELS UNDER CONTRACT IN LAKE SHIP YARDS, DECEMBER 15, 1893.

| BUILDERS. | CLASS. | DIMENSIONS. | Capacity of freight vessels, gross tons. | VALUE. | FOR WHOM BUILDING. |
|---|---|---|---|---|---|
| Globe Iron Works Company, Cleveland, O. | Steel Pass. Stmr. | 383 x44 x34 | ..... | $500,000 | Northern Steamship Company. |
| " " " " " | " " " | 383 x44 x34 | ..... | 500,000 | " " " |
| Detroit Dry Dock Company, Detroit, Mich. | " Frt. Stmr | 360 x42 x— | 4,000 | 225,000 | E. T. Peck, et al, Detroit, Mich. |
| American Steel Barge Company, W. Superior, Wis. | " " " | 320 x38 x24 | 3,000 | 150,000 | American Steel Barge Co. |
| James Davidson, W. Bay City, Mich. | Wooden Frt. Stmr. | 320 x43 x26 | 3,000 | 150 000 | James Davidson. |
| " " " " " | " " " | 250 x37½x20 | 2,000 | 100,000 | " " |
| " " " " " | " " " | 250 x37½x20 | 2,000 | 100,000 | " " |
| " " " " " | " Schooner | 236 x38½x20 | 2,000 | 50,000 | " " |
| F. W. Wheeler & Co., W. Bay City, Mich. | Wooden Ferry boat | 140 x51 x14¼ | ..... | 60,000 | Detroit, Belle Isle & Windsor Ferry Co. |
| Craig Ship Building Co., Toledo, O. | U. S. light-ship | 125 x28 x12 | ..... | 60,000 | U. S. Government. |
| " " " " " | Steam yacht | 75 x16 x 7 | ..... | 5,000 | James Fifield. |
| David Bell, Buffalo, N. Y. | U. S. Revenue Stmr. | 94½x20½x10½ | ..... | 38,500 | U. S. Government. |
| " " " " | Twin-screw yacht | 54 x10 x 5 | ..... | 3 500 | Builder's account. |
| C. T. Morley, Marine City, Mich. | Wooden steamer | 200 x37 x14 | 1,400 | 90,000 | Sicken Steambarge Co. |
| R. W. Linn, Gibraltar, Mich. | " " | 212 x37 x12 | 1,200 | 65,000 | Wolverine Barge Co., Detroit, Mich. |
| Abram Smith & Son, Algonac, Mich. | " Barge | 180 x34 x12 | 600 | 30,000 | A. W. Comstock, Alpena, Mich. |
| R. Holland, Marine City, Mich. | " " | 246 x41 x22 | 2,500 | 75,000 | N. & B. Mills, Marquette, Mich. |
| Rogers & Bird, Saugatuck, Mich. | " Pass. Stmr. | 117 x21 x 8½ | 225 | 16,000 | Rogers & Bird Lumber Co. |
| " " " " | " Tug | 53 x12 x 5½ | ..... | 4,000 | " " " " |
| E. W. Heath, Benton Harbor, Mich. | Pass. Steamer | 145 x26 x11 | ..... | 25,000 | Graham & Morton Trans. Co. |
| " " " " | Wooden tug | 77 x16 x 6 | ..... | 8,000 | Connable Fishing Co., Petoskey, Mich. |
| A. W. Hepburn, Picton, Ont. | " Steam barge | 115 x22½x— | 275 | 25,000 | A. W. Hepburn. |
| Carkin, Stickney & Cram, Saginaw, Mich. | " Tug | 63 x16 x— | ..... | 8,000 | Carkin, Stickney & Cram. |
| Thos. Manning, Jr., & Co., Cleveland, O. | Fire boat | 82 x21 x11 | ..... | 33,000 | City of Cleveland, O. |
| P. F. Thrall, Green Bay, Wis. | Wooden steamer | 178 x35 x11½ | 1,000 | 45,000 | For Builders. |
| Curtis & Brainard, Marine City, Mich. | " " | *220 x— x— | *1,800 | *90,000 | " " |
| Grand Haven Ship Building Co., Grand Haven, Mich. | " " | 190 x35 x15½ | 1,400 | 75,000 | W. H. Loutit, Grand Haven, Mich. |
| " " " " " " " " | " Tug | 75 x15 x 6¾ | ..... | 7,500 | J. McCann, St. James, Wis. |

*Estimated.

VESSELS UNDER CONTRACT IN LAKE SHIP YARDS IN DECEMBER OF EACH YEAR FOR EIGHT YEARS PAST.

| December 15. | Number of boats. | Capacity, gross tons. | Valuation. |
|---|---|---|---|
| 1886 | 31 | 65,750 | $4,074,000 |
| 1887 | 60 | 108,525 | 8,325,000 |
| 1888 | 59 | 100,950 | 7,124,000 |
| 1889 | 56 | 124,750 | 7,866,000 |
| 1890 | 38 | 77,950 | 5,337,000 |
| 1891 | 45 | 76,000 | 4,896,000 |
| 1892 | 49 | 68,470 | 6,909,500 |
| 1893 | 28 | 26,400 | 2,538,500 |
| Total | 366 | 658,795 | $47,070,000 |

The reports from coast yards, which are much more complete than last year, also show anything but a prosperous condition. The valuation of merchant vessels now building—furnished by builders and conservatively estimated in a few instances—is 6,963,700, and the capacity of vessels to enter the carrying trade is 11,800 gross tons. Last year the reports showed a valuation of $4,560,000 and a gross ton carrying capaoity of 19,900. The increase in valuation is due to the high cost of the International steamers building at the Cramp yard, the value of which is estimated at $1,500,000 each. Excluding these the valuation would be about the same as last year. The decrease in tonnage is due to the fact that there are very few cargo boats building in coast yards, while last year there were two 5,000 "tonners" building at Newport News, where there is nothing but gun boats at present. Removing the unusual features, the building of merchant vessels in coast yards has lost but little, although the decrease is more than appers, as the report is much more complete than last year. The valuation of naval vessels now under construction in government and private coast yards is $31.963,546, while last year at this time the valuation of naval work amounted to $53,000,000, showing that the new naval work is not keeping pace with what has been finished and put forth from coast yards during the past year. Private advices from the Coast Seamen's Journal, San Francisco, Cal., give as a cause for the lack of work in Pacific coast yards that there are 160 coasting vesrels laid up in and around San Francisco and many more on the Sound.

In presenting this information, which comprises no little labor and expense, the MARINE REVIEW wishes to acknowledge courtesies from the ship builders of the country and congratulate itself on being the only marine paper in the United States that compiles such information.

BUILDING IN COAST AND RIVER SHIP YARDS.

The William Cramp & Sons Ship and Engine Building Company, Philadelphia, Pa.—In addition to the five naval vessels building, particulars of which are shown in the list of naval vessels, this company has under construction Nos. 277 and 278, the two Atlantic liners for the International Navigation Company. The dimensions are 536 by 63 by 42 feet, and the approximate gross tonnage 11,000. They are also building the steel steam yacht Columbia, 180 by 22 by 95 feet and costing $175,000, for J. Harvey Ladew.

Atlantic Works, East Boston, Mass.—Steel steam yacht, yard No. 100, dimensions 157 by 22 by 12½ feet, value $85,000; wooden tug for T. B. Sprague et al., 83 by 18 by 9 feet, value $20,000.

John Dialogue & Son, Camden, N. J.—Tug, yard No. 329, for E. Annan, 90 by 21 by 10 feet, 100 tons.

Jackson & Sharp Company, foot East 7th st., Wilmington, Del.—Tug boat Le Baron for National Dredging Co., Wilmington, Del., 84 by 21 feet 10 inches by 10 feet, 152 tons, value $22,000; machinery by the Harlan & Hollingsworth Co.

Delaware River Iron Ship Building and Engine Works, Chester, Pa.—Two passenger steamships, Jamestown and Yorktown, for the Old Dominion Steamship Company, New York, N. Y. Dimensions are the same in both, 300 by 40 by 26 feet 9 inches, capacity about 3,000 tons, value $350,000 each.

Maryland Steel Co., Marine Dept., Sparrows Point, Md.—Steel steamer Patrol for New York police department, 143½ by 23 by 10½ feet, tonnage gross about 235; steel steam yacht Dungeness for Mrs. Carnegie, Pittsburg, Pa., 123½ by 20 by 10 feet 4 inches, tonnage about 155.

Bath Iron Works, Limited, Bath, Me.—In addition to the Katahdin shown in list of naval vessels this company has building the Sound passenger steamer City of Lowell for the Norwich and New York Transportation Company, 336 by 66 by 12 feet, the displacement being about 2,400 tons and the cost $436,000; steel steam yacht Eleanor for Wm. A. Slater, Norwich, Conn., 230 by 32 by 13 feet, 1,150 tons displacement, value $325,000.

Pacific Steel Barge Company, Everett, Wash.—Steel freight steamer City of Everett, 360 by 42 by 26½ feet, cargo capacity gross tons 4,500, value $250,000.

Wm. McKie, 100 Border st., E. Boston, Mass.—Passenger steamer for the Boston & Bangor Steamship Co., 278 by 38 by 14½ feet, capacity gross tons 1,600, value $250,000.

Arthur Sewall & Co., Bath, Me.—Steel sailing ship, dimensions 300 by 45 by 24 feet 9 inches, capacity gross tons 4,400.

Wm. T. Donnell, Bath, Me.—Four-masted schooner, 194 by 40 feet 4 inches by 19½ feet deep, capacity gross tons 1,250, value $60,000.

Saml. H. Barbour, Brewer, Me.—Passenger steamer 70 feet long for Conners Bros., Bar Harbor, Me.

McDonald & Brown, Belfast, Me.—Four-masted barkentine for C. Morton Stewart & Co., Baltimore, Md., capacity gross tons 1,350, value $43,000.

Arthur D. Story, Essex, Mass.—Schooner for Capt. Edward Groves, Gloucester, Mass., 105 by 24 by 9½ feet, capacity 105 tons, value $9,000; two schooners for M. Walen & Son, Gloucester, Mass., one 85 by 20 by 8 feet, 60 tons, value $6,500, and one 105 by 24 by 10½ feet, 115 tons, value $10,000; schooner on builder's account, 103 by 23 by 9½ feet, 100 tons, value $9,000.

L. D. Shafner, Clementsport, Annapolis County, N. S.—Schooner on builder's account, 87 by 26 by 9½ feet.

Madison Marine Railway, David S. Barmore, propr., Madison, Ind.—Nine scow barges and six model barges, the former 400 tons each and the latter 350 tons each, the value of former being $3,500 each and the latter $4,000 each, for the United States government. Twenty-six steamers were docked and repaired at this yard during the past year.

Iowa Iron Works, Dubuque, Ia.—The Ericcson building here is mentioned in the naval list. In addition to that the U. S. revenue cutter Wm. Windom, 170 by 27 feet, is under construction and will cost $98,500.

Fillmore A. Baker, Patchogue, L. I.—Three sloops, 28, 29 and 30 feet keel and valued at $1,000 each, a 24-foot cat boat, $500, and a 29-foot steam launch valued at $1,200.

C. D. Miller, Poughkeepsie, N. Y.—Wooden steam yacht Nirvana for Wm. R. Sands, New Hamburgh, N. Y., 106 by 16 by 5½ feet, value $28,000, engines 9, 14½ and 22 by 14 inches, speed 15 miles; steam yacht W. B. rebuilding for W. B. Hayden, New York, 88x12½ feet, value $16,000.

Stillman Saunders, Saunderstown, R. I.—Passenger steamer for H. S. Bloodgood, Providence, R. I., 94 by 18 by 9 feet, value $11,000.

Geo. Lawley & Son Corporation, So. Boston, Mass.—One 20-foot cutter valued at $3,000 and one 45-foot schooner yacht, $8,000, on builders' account.

John P. Smith, Nyack, N. Y.—Twin-screw passenger steamer for Capt. Thos. Pitt, So. Brooklyn, N. Y., 120 by 23 by 7 feet, value $20,000.

Merril-Stevens Engineering Co., Jacksonville, Fla.—Steel hull propeller 45 by 9 by 5 feet, value $3,000. This company built during the year a 5-ton wooden launch, a 38-ton steel stern wheel steamer and a 90-ton passenger propeller, the total valuation being $22,200.

The Brusstar Ship Building Company, Baltimore, Md.—Tug Lucille Ross, for W. R. Ross, Seaford, Del., 75 feet long, value $13,000; tug May Russell for Vivian Phillipa, Baltimore, Md., 65 foot long, value $9,000; tug Louise, James & Marshall, Petersburg, Va., 50 foot long, value $6,000; schooner Maggie A. Phillips, Webster, Ford & Co., Baltimore, Md., 100 by 26 by 7½, 155 tons, value $11,000; four scows from 100 to 300 tons, total valuation $7,700.

McEntee & Rodie, Rondout, N. Y.—Twin screw steel hull passenger steamer, just completed for Thebaud Bros., Trinidad, So. America, 65 by 14 by 6 feet.

Elmer A. Ely, Middletown, Conn., is building an auxilliary sail boat, a 30-foot steamer and a 27-foot cat boat. D. O. Haynes of Middletown will own the sail boat, and Chas. Doolittle, engine builder of Windsor, Conn., will own the steamer.

Fulton Iron Works. Harbor View Yard, San Francisco, Cal.—Ferry boat for North Pacific Railroad Company, 2,000 tons, 245 by 38½ by 16½ feet, side-wheeler with engines of 1,200 horse power.

The Whitelaw Wrecking Company, San Francisco, Cal, will build a wrecking steamer to be named the Whitelaw, but dimensions are not obtainable.

During the past year four passenger and freight steamers and four schooners, the eight boats having a total tonnage of 2,208 tons, have been built on the Pacific coast at Fair Haven, Cal., Alameda, Cal, Eureka, Cal., Prosper, Ore., Benicia, Cal., and Blakeley, Wash.

The Columbian Iron Works and Dry Dock Company, Baltimore, Md., have nothing but the 2,050-ton protected cruiser, which is so nearly completed that it was not included in the naval list.

T. S. Marvel & Co., Newburgh, N. Y.—Twin screw despatch boat for U. S. engineer, Galveston, Tex., 86 by 20 by 7½ feet, value $30,000; caisson for U. S. government dock, Puget sound, 104 by 24 by 34 feet, value $60,000; twin screw passenger steamer for R. L. Darragh, New York, 105 by 17½ by 6½ feet, value $22,000; tug for builders, 90 by 22 by 10½ feet, value $23,000.

The Neafie & Levy Ship and Engine Building Company, Philadelphia, Pa.—Iron tug No. 874, Boulton, Bliss & Dallett, New York, N. Y., 125 by 22½ by 12 feet, estimated value $40,000; two iron tugs for stock, almost completed, one 75 by 17 by 8½, value $16,500, and one 92 by 19 by 10 feet, value $25,400.

Pamlico Railways, John Myers Son, Washington, N. C.—Car transfer barge for Norfolk & Southern Railroad, 125 by 31 by 7½ feet, value $5,000. I. A. Farron is reported to be building a small steamer at the same place.

Sawyer Bros., Millbridge, Me.—Four masted schooner for builders, 167 by 36 by 12 feet and 6 feet between decks, capacity 950 tons, value $35,000.

Clay Johnson, Kissimmee City, Fla.—Stern wheel steamer Roseada, 54 by 12 feet, value $2,500.

Frank S. Bowker, Phippsburg, Me.—Three masted schooner James H. Dudley, 380 tons, completed this month.

Kelly & Spear Company, Bath, Me.—Three masted schooner M. S. Roper for John Roper Lumber Company, 400 tons, just completed.

N. T. Palmer, Bath, Me.—Four masted schooner, 1,400 tons, 210 by 38 by 22 feet, for builder and others.

C. B. Harrington, Bath, Me., is building a 30-foot fisherman for Black island parties, and T. Hagan, Bath, Me., is building two 40 "footers" for Bath parties.

Morse Ship Building Company, Bath, Me.—Three masted schooner, 900 tons for builders and others.

New England Ship Building Company, Bath, Me.—Wooden passenger steamer for the Portland Steam Packet Company, 280 by 42 by 15½ feet.

C. V. Minot, Phippsburg, Me.—Four masted schooner, 1,260 tons.

Gardner B. Reynolds, Newport, R. I.—Four masted wooden schooner, 1,400 tons.

Beam and others, Camden, Me.—Four masted schooner, 1,400 tons.

### INDIRECT REPORTS OF BUILDING DURING PAST SIX MONTHS.

White's yard, Alameda, Cal.—Two ferry boats for Davie line.

Peter Matthews, Eureka, Cal.—Steam schooner.

Union Transit Co., Seattle, Wash.—Steamer 137 by 24 by 9 feet, 275 tons.

White's yard, Oakland, Cal.—Steamer 150 by 32 by 6 feet for T. P. H. Whitelaw.

McDonald & Anderson, New London, Conn.—Four-masted schooner, 1,000 tons, for Capt. Mehaffy.

Ward line, New York, N, Y., is said to be planning for a steamer.

Herreshoff Mfg. Co., Bristol, R. I.—Twin-screw steam yacht, 185 by 22½; 75-foot steam yacht for J. B. Herreshoff; 110-foot steam yacht for H. C. Baxter, Brunswick, Me., and two sail yachts.

Chas. S. White, San Francisco, Cal.—Gasoline propeller, 80 by 26 by 7½ feet, for 140,000 feet of lumber.

A. L. Stevens, Darien, Conn.—A 27 and a 48-foot steam launch.

Gesner & Mar, West Haven, Conn.—Four-masted schooner.

Capt. Ed Howard, Jeffersonville, Ind.—Three 125-foot tow boats; a packet for Capt. Pickles; 160-foot steamer for Capt. Kendall; 165-foot steamer for Campbell Creek Coal Co.; ten pontoons, six barges and four quarter boats.

Pocomoke Gasoline Boat Co., Pocomoke City, Md.—Gas engine boat 90 by 24 feet.

The Sweeney-Fry Co., Jeffersonville, Ind.—Three 125-foot ferry steamers and one 150-foot survey steamer.

Waterman K. Pryor, City Point, So. Boston, Mass.—Three steam yachts.

Port Clyde Marine Railway Co., Port Clyde, Me.—A 335-ton schooner.

Wright & Hague, Oakland, Cal.—A 150-foot ferry steamer.

Diamond Jo. Company, Dubuque, Ia.—Steamer 125 by 15 feet.

Chautauqua Steamboat Co., Jamestown, N. Y.—Passenger steamer 100 feet long.

R. T. Keough, E. Boston, Mass.—Large tug.

N. A. Jacobs, Portland, Me.—Two steam yachts, 50 by 9½ by 5 feet, 40 horse power. One is for Barker & Gilson and the other for H. S. Stickney.

Portland Steam Packet Co., Portland, Me., will build a passenger steamer.

### YARDS WHICH REPORT NOTHING BUILDING.

G. S. Deering, Bath, Me.
H. D. Bendixsen, Eureka, Cal.
Noble Times, Fairport, Va.
Willard A. Burnham, Essex, Mass.
S. H. Pine, 139 Noble st., Brooklyn, N. Y.
The Lutcher & Moore Lumber Co., Orange, Tex.
A. & M. Gammage, So. Bristol, Me.
C. Reeder & Sons, Baltimore, Md.
The James Clark Co., Baltimore, Md.
C. & R. Poillon, foot Clinton st., Brooklyn, N. Y.
Niagara Navigation Co., Toronto, Ont.
The Saml. L. Moore & Sons Co., Elizabeth, N. J.
E. S. Crosby, Bath, Me.
M. G. Knox & Son, Marietta, O.
Phillip H. Gill. Brooklyn, N. Y.
Axton & Son, W. Brownsville, Pa.
A. R. Reed, Waldoboro, Me.
Pusey & Jones Company, Wilmington, Del.
Harrison Loring, City Point Works, Boston, Mass.
Perkins & Blaisdell, Bath, Me.
C. P. Carter & Co., Belfast, Me.

### YARDS FROM WHICH NO REPORT WAS RECEIVED.

James Rees & Sons, Pittsburgh, Pa.
Chas. Hillman, S. & E. B. Co., Philadelphia, Pa.
C. L. Seabury & Co., Nyack, N. Y.
Palmer's yard, Noank, Conn.
J. H. Crandon, Columbia Falls, Me.
E. J. Brennen, Columbia, S. C.
Spencer Island Company, Spencer, N. B.
Carter Company, Belfast, Me.

A. Eldridge, Tottenville, N. Y.
Har an & Hollingsworth Company, Wilmington, Del.
Capt. Fogg, Bucksport, Me.
W. I. Adams, E. Boothbay, Me.
Washburn Bros., Port Clyde, Me.
A. R. Reed & Co., Waldoboro, Me.
Tarr & James, Essex, Mass.
Wm. E. Woodall & Co., Baltimore, Md.
John Brooks, E. Boston, Mass.
Hugh Ramsay, Perth Amboy, N. J.
C. G. Whitem, Oakland, Cal.
Washburn Bros., Thomaston, Me.
E. G. Crosby, Bath, Me.
Dickie Bros., 54 Mission st., San Francisco, Cal.
Henry Sutton, West Haven, Conn.
Murray & Hermanson, Lake Charles, La.
Gardner, Mosher & Co., City Island, N. Y.
G. A. Gilchrist, Rockland, Me.
Portland Marine Railway, Portland, Me.
Capt. Luther, So. Sioux City, Ia.
Capt. Combs, Camden, Me.
Ambrose Martin, E. Boston, Mass.
Capt. G. M. McLain, Essex, Mass.
Hitchings & McWhinney, Eureka, Cal.
Union Iron Works, San Francisco, Cal.
Cowles Engineering Co., So. Brooklyn, N. Y.
J. Walton & Co., Elizabeth, Pa.
Hodge Bros., Boothbay, Me.
J. W. Carpenter, Natchez, Miss.
Hall Bros, Port Blakeley, Wash.
Capt. Crammond, Hawesville, Ky.
Wm. Christenson, Kennebuckport, Me.
J. C. Lake & Sons Co., Baltimore, Md.
I. L. Snow & Co., Rockland, Me.

### LAKE SHIP BUILDING NOTES.

David Bell, Buffalo, N. Y., is building a twin-screw yacht, 54 feet over all, valued at $3,500 that he will sell cheap.

Santa Maria is the name of the boat building by C. T. Morley, Marine City, Mich., for the Sicken Steam Barge Company.

The Wolverine, building by R. W. Linn, Gibralter, Mich., wi l be ready for service May 1.

In addition to three steamers and a schooner James Davidson will build four large lighters at West Bay City, Mich.

The tow barge building by Abram Smith & Son at Algonac will have a co nplete steam windlass outfit of the finest kind.

E. W. Heath, Benton Harbor, Mich., in addition to his $25,000 rebuilding job, and a tug, is building a $1,500 steam yacht and is rebuilding the sail yacht Sadie of Chicago.

The Truscott Boat Manufacturing Company, St. Joseph, Mich., is building fourteen launches from 20 to 40 feet long for parties in all parts of the United States.

Jas. P. Devney, Harbor, O., Will build a fishing tug later iu the season.

William S. Hatch, Bellaire, Mich., is reported to be building an auxiliary schooner. Enough steam power is to be given the schooner to enable her to move around in harbors without a tug.

It is reported that A. Morrill, Owen Sound, Ont., will build two tugs, one for James Pratt of Parry Sound, Ont., and the other for H. McGuiness of Meaford, Ont.

The Thompson Towing Company, Port Huron, Mich., will build two tugs at Port Huron this winter.

John E. Monk, Sandusky, Ohio, is building a 3,200 fish tug, 60 by 16 by 6 feet, on his own account.

The Calvin Company, Lim., Garden Island, Ont., is building a tug 110 by 21 by 10 feet, the engines and independent condenser for which are being built at the company's shop, but the boiler will be built by John Inglis & Son, Toronto, Ont. The Calvin Company is also building a $25,000 St. Lawrence river grain carrying barge, 180 by 36 by 12 feet hold. Both the tug and barge are for builders.

### LAKE YARDS REPORTING NOTHING UNDER CONTRACT.

Wm. Dulac, Mount Clemens, Mich.
Milwaukee Dry Dock Company, Milwaukee Wis.
Cleveland Ship Building Company, Cleveland, O.
Chicago Ship Building Company, Chicago, Ill.
Union Dry Dock Company, Buffalo, N. Y.
The Langell & Sons Company, St. Clair, Mich.
Jenks Ship Building Company, Port Huron, Mich.
H. B. & G. B. Burger, Manitowoc, Wis.
Rieboldt, Wolter & Company, Sheboygan, Wis.
Hamilton Bridge Company, Llmited, Hamilton, Ont.
Bertram Engine Works Company, Toronto, Ont.

### ENGINE BUILDING ITEMS.

H. R. Stickney, Portland, Me., is building two 40 horse power engines for yachts building by N. A. Jacobs. Roberts Iron Works, Cambridgeport, will furnish the boilers.

James Mahan, Canastota, N. Y., is building two twin engines for the Tourist building at Nyack, N. Y.

Bath Iron Works, Bath, Me., is building the ship machinery for the schooner building by McDonald & Brown, Belfast, Me.

J. H. Pain & Co., Boston, Mass., is building a 9, 18 by 12 inch compound for the steamer building by S. H. Barbour, Brewer, Me.

W. & A. Fletcher Company, Hoboken, N. J., is building the engines for the $250,000 Boston & Bangor line steamer.

C. P. Willard & Co., Chicago, Ill., is building the boiler and stern-wheel engines for the Roseada building at Kissimme C ty, Fla.

The Frontier Iron Works, Detroit, Mich., is building the triple expansion engines for the steamer City of Everett building at Everett, Wash. This company is also building the engines for the three Davidson steamers.

S. F. Hodge & Co., Detroit, Mich,, are building the engines for the Union Transit steamer building at Seattle, Wash. They will also engine the steamer building at Gibralter, Mich.

Harlan & Hollingsworth Co., Wilmington, Del., is building machinery for the tug Le Baron, building by the Jackson & Sharp Co., Wilmington, Del.

The Montague Iron Works, Montague, Mich., are building the 14 and 28 by 20 inch engine for the steamer building at Saugatuck, Mich., for Rogers & Bird who have not as yet contracted for a 12 by 14 inch engine for a tug they are building.

### U. S. NAVAL VESSELS UNDER CONSTRUCTION.

| NAME. | Displacement, tons. | Horse power. | Cost of hull and machinery | WHERE BUILDING. |
|---|---|---|---|---|
| Texas | 6,300 | 8,000 | $2,500,000 | U. S. Navy Yard, Norfolk, Va. |
| Raleigh | 3,183 | 10,000 | 1,100,000 | " " " " |
| Maine | 6,648 | 9,000 | 2,500,000 | " " " Brooklyn, N. Y. |
| Cincinnati | 3,183 | 10,000 | 1,100,000 | " " " " |
| Katahdin | 2,183 | 4,800 | 930,000 | Bath Iron Works, Bath, Me. |
| Oregon | 10,200 | 9,000 | 3,180,000 | Union Iron Works, San Francisco, Cal. |
| Olympia | 5,500 | 13,500 | 1,796,000 | " " " " " " |
| Massachusetts | 10,200 | 9,000 | 3,020,000 | Wm. Cramp & Sons, Philadelphia, Pa. |
| Indiana | 10,200 | 9,000 | 3,020,000 | " " " " " |
| Iowa | 11,296 | 11,000 | 3,010,000 | " " " " " |
| Minneapolis | 7,350 | 21,000 | 2,690,000 | " " " " " |
| Brooklyn | 9,153 | 16,000 | 2,986,000 | " " " " " |
| Gunboat No. 7. | 1,261 | 1,750 | 280,000 | Newport News (Va.) Ship Bldg. & D. D. Co. |
| Gunboat No. 8. | 1,313 | 1,600 | 280,000 | " " " " " " " |
| Gunboat No. 9. | 1,313 | 1,600 | 280,000 | " " " " " " " |
| Ericcson | 120 | 1,800 | 113,500 | Iowa Iron Works, Dubuque, Ia. |
| | 89,403 | 137,050 | $28,785,500 | |

The Puritan of 6,060 tons displacement, 3,700 horse power, commenced at Roach's yard in 1875 and the Terror of 3,990 tons and 1,600 horse power, commenced at Cramp's yard in 1874, are in course of completion at the United States navy yard, New York. The Amphitrite of 3,990 tons and 1,600 horse power, commenced in 1874 at Harlan & Hollingsworth's yard, is being finished at the Norfolk navy yard, and the Monadnock, commenced the same year at the Mare island yard, having 3,990 tons displacement and 3,000 horse power, is being completed there. There was an appropriation of $3,178,046 made to complete these four vessels. Oct. 1, 1896, is the date set for the completion of the Iowa, which will be the last of those at present under contract.

## Argument in Favor of a Department of Commerce.

In his annual report the retiring commissioner of navigation, E. C. O'Brien, makes a very strong argument against the several propositions for a marine board, but he favors instead the formation of a department of commerce. He presents the following schedule of the various offices of the government, which have to do with the internal and foreign commerce of the country, its internal transportation and navigation, and marine interest, together with the amount of money appropriated for carrying on their operations during the fiscal year ended June 30, 1893:

| TREASURY DEPARTMENT— | Cost of operations, year ending June 30, 1893. |
|---|---|
| Light-house board and establishment | $ 2,526,340.00 |
| Steamboat inspection service | 312,630.00 |
| Marine hospital service | 645,181.00 |
| Life saving service | 1,126,330.00 |
| Bureau of navigation | 25,780.00 |
| Coast and geodetic survey | 465,720.00 |
| Bureau of statistics of internal and foreign commerce | 47,710.00 |
| Seal and salmon fisheries of Alaska | 18,950.00 |
| Seamen shipping service | 60,527.52 |
| Shipping commissioners | 53,011.04 |
| Immigration service | 228,975.29 |
| Total | 5,777,554.85 |

| | |
|---|---|
| STATE DEPARTMENT— | |
| Bureau of American republics | 30,000.00 |
| INTERIOR DEPARTMENT— | |
| Railroad commission (Pacific railroads) | 16,020.00 |
| WAR DEPARTMENT— | |
| Improvements of rivers and harbors | *22,068,218.00 |
| NAVY DEPARTMENT— | |
| Hydrographic office | 91,440.00 |
| OFFICES NOT IN ANY ONE OF THE GREAT DEPARTMENTS— | |
| Fish commission | 327,950.00 |
| Interstate commerce commission | 225,000.90 |
| Intercontinental railway commission | 65,000.00 |
| Total | 617,950.00 |
| Grand total for the above named offices | $28,600,682.85 |

"Certain of the propositions for a marine board," says the ex-commissioner, "contemplate a body composed of persons of eminent ability and assured charecter in private life, who are to be paid only when convened as a board or actually engaged in its work. Others would limit its membership to the heads of certain offices of the government. It is also suggested by some to give to the proposed board plenary, administrative and executive functions, while others would make it merely advisory. The creation of such a board is, in my opinion, not only undesirable but subject to grave objections. It would add to the responsibilities and duties of the secretary of the treasury, now overpowering in magnitude, instead of relieving that important office. The work required to be done in an efficient supervision of the administration of the laws in regard to shipping, and in the promotion of the interests of the American merchant marine, necessitates the undivided attention of a responsible head, and such prompt action as, upon due consideration, may appear to be desirable. I greatly fear that the plan of committing particular responsibilities to officers of the government presiding over different branches of its work would lead to divided councils, and introduce inefficiency and that perfunctory performance of official duty which has for its chief inspiration the idea of how not to do it.

"The framers of the law of July 5, 1884, organizing the bureau of navigation clearly intended that it should constitute the first step in what must result in an important reorganization of governmental offices relating to commerce, transportation, navigation and marine interests, so as to group all governmental functions relating to those subjects into one great department of the government, corrosponding to the British board of trade, and presided over by a secretary. The board of trade of England embraces the harbor department, commercial department, railway department, marine department and fisheries department. The president or chief executive of the board is a member of the British Parliament, and each of the departments is presided over by an assistant secretary. The total appropriations for salaries for 1893 amounted to £72,601, or about $363,000.

*River and harbor appropriations during the last ten years amount to the enormous sum of $116,132,682.90.

## Rafting Business Must be Regulated.

Several days ago Mr. Lamont, secretary of war, submitted to Congress the report of the board of army engineers, consisting of Col. O. M. Poe, Major Davis and Major Sears, who investigated the subject of raft towing on the lakes. The report contains the proceedings of the board, the briefs of the Lake Carriers' and Raft Towing Associations, the reply of the latter to the Lake Carriers' Association and other valuable testimony on the subject. The board finds:

First—That raft towing, as now conducted on the great lakes and their connecting waters, is a serious impediment to navigation and is a menace to life and property.

Second—That it causes great inconvenience and expense to the government by the destruction of buoys, stakes and other matters placed to define the channels.

Third—That this displacement of buoys, stakes, etc., adds materially to the risks of navigation.

Fourth—That raft towing should be regulated by clear and comprehensive laws which shall include adequate penalties for their violation.

The board recommends the following legislative restrictions:

First—That the towing of logs in what are known as bag or sack rafts on the open waters of the great lakes shall be permitted; but that every vessel having a raft in tow shall carry between sundown and sunrise, in addition to the colored signal lights prescribed by treasury regulations, two white lights, showing all around the horizon not less than eight feet apart and in a horizontal line and at least twenty feet above the deck; that for use in thick or foggy weather said vessel shall carry what is known as a screeching whistle for giving fog signals as are now in force upon steamers having tows; the use of such screeching whistles upon vessels not having rafts in tow being declared illegal except for fire or police boats engaged in their duties as such.

Second—That every vessel towing a raft shall give at least half the channel way, wherever the width of channel will permit, to vessels going in the same or an opposite direction.

Third—That every vessel having a raft in tow shall avoid running over or against buoys, or other channel marks, wherever practicable; and that, furthermore, in case of the unavoidable destruction or displacement of any of said buoys, stakes or other channel marks, it shall be the duty of the master or others in charge of said towing vessel to report the fact to the lighthouse inspector of the district by telegraph, if possible, and if not possible, then by mail at the earliest practicable moment.

Fourth—In all channels and harbors marked by buoys or other channel marks or where passage between piers or alongside of revetted banks is necessary, rafts shall be so constructed that the boom logs surrounding the rafts shall overlap each other, outward and aft, from front to rear, at least three feet and be fastened together by chains, ropes or other fastenings short enough to prevent the laps straightening out.

Fifth—That in and through connecting waters of the lakes, such as harbors and rivers with narrow entrances and channels, no bag rafts shall be permitted.

Sixth—That when any vessel and its tow of logs in bag or sack rafts are obliged by stress of weather to take refuge between entrance piers or any narrow channel of a river or harbor, the burden of proof as to the necessity of so taking refuge being upon the towing vessel, the raft shall at once be reconstructed so as to leave at least one-half the passage way clear, and the whole raft shall be moved as soon as possible out of the way of passing vessels; and that each and every period of twenty-four hours after the first twenty-four hours that said raft shall be left in shape to obstruct navigation shall constitute a separate offense.

Seventh—That for entering and navigating all harbors with narrow channels, all rivers navigated by vessels other than rafting tugs, except in the rivers St. Mary, St, Clair and Detroit, and for entering or passing through the Portage lake ship canals across Keweenaw point, logs shall be made into crib rafts, with the logs essentially parallel to each other in the direction of raft length and be held together by frequent cross sticks, chains or cables; and that rafts shall not be of greater dimensions either way than fifty feet wide by 600 feet long, and if longer than 300 feet shall be handled by two tugs of sufficient power to properly control them.

Eighth—That raft towing through either the Hay lake channel or the St. Clair flats canal shall be entirely prohibited.

Ninth—That on the St. Mary's river between Sault Ste. Marie and the head of Mud lake, at a point two miles below the position of the Encampment crib light, rafts shall not exceed 600 feet in length and 60 feet in width; that they shall be securely fastened by cross-tie or otherwise to preserve as far as possible a uniform width; that each raft shall be handled by not less than two tugs of sufficient power to keep the raft under control and to move it to one side of the channel sufficiently to permit vessels to pass.

Tenth—That on the St. Clair and Detroit rivers rafts shall not exceed in length 1,200 feet, nor in width 100 feet; that they shall be tightly cross-tied to preserve uniform width.

Eleventh—That for the willful violation of the foregoing restrictions the towing vessel shall be liable to a fine of not less than $100, and not more than $1,000; and the master or other person in charge of the towing vessel shall be imprisoned for not less than one month and not more than six months for each offense at the discretion of the United States court having jurisdiction; and that in addition to the penalties thus imposed the towing vessel shall be liable at civil action for damages occurring as a result of the willful violation of these regulations.

# NO LICENSE FOR CAPTAIN, ENGINEER OR PILOT.
# NO COAL OR WOOD TO CARRY. NO SMOKE. NO DIRT.

## . . Description of Boat fitted with a GASOLINE ENGINE.

THE engine sits lengthwise of the boat if it is a stern-wheel, and crosswise if it is a propeller.

Ths frictions are so arranged that the management of the wheel is under the complete control of the pilot, and by operating a lever which stands to his right, he either starts ahead or back, or stops the wheel in the same length of time it takes to ring the signal-bell of a steamer.

There is also a lever in the pilot-house to his left, which regulates the speed of the engine. If you are running over a shoal and wish to go slow, by moving the lever to another notch the wheel is immediately slowed down.

We more especially aim to produce a durable motor. Steam engines and boilers in general, as most people who are familiar with them know, require repairs every season that equal one-third of the original cost.

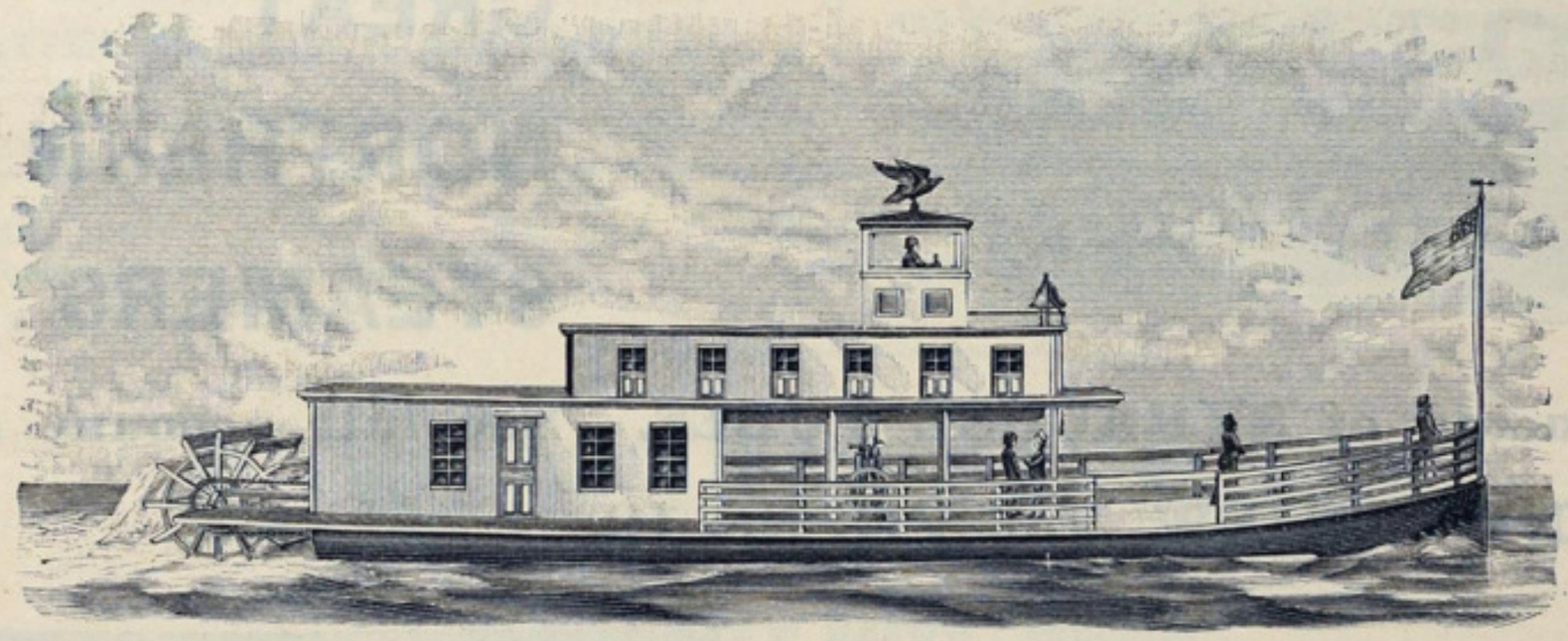
**SAFETY.**—As to the safety of operating an engine of this kind on a boat, we will say it is much safer than a steam engine, as it is absolutely impossible to cause an explosion, since there is no boiler or steam. As to fire, there is none of the gasoline exposed to the atmosphere, hence no possibility of an accident from this source.

**CARE AND ATTENTION.**—All the care and attention it needs is, that it be kept properly lubricated and cleaned off occasionally.

**THE PUMP.**—The pump is used for circulating water around the cylinder, and, if desired, can be so connected that the water can be utilized for washing off the deck, etc.; and as it is kept constantly running, it is always ready at any time.

If you wish prices for reversing gears, please give length of boat, width and draught, also speed you wish to run, and whether stern-wheel, side-wheel or propeller.

We do not build the gearing for boats requiring smaller than four horse-power.



### RUNNING A BOAT WITH A 23 HORSE POWER ENGINE.

**CAPT. B. F. REYNOLDS, WHEELER, S. D.**

Van Duzen Gas and Gasoline Engine Co., Cincinnati, O.

Gentlemen :—The engine and gearing is a fine outfit. I can run in any wind and have not been laid up one hour on that account. It is ready and can run at any time. There has been several old steamboat men looking at it and they think the day is coming when it will be the motive power to navigate the Missouri river with because it is so much cheaper to run. A 50 horse power would run a boat of 100 tons and that is as large a boat as can run in this river at all stages of water. The U. S. snag boat, McPherson, with fifty horse power laid up for three days on account of wind at this place, but it had no effect on my boat at all, and it blew a gale down stream at that, so you can judge it runs all right. I do not know of anything further that I might add unless it is that every person contemplating the building of a boat should place one of your engines on it. They are absolutely reliable and safe, and your manner of handling the paddle wheel from the pilot house is perfection; also let me say right here that I think the Van Duzen company the finest men it has been my pleasure of dealing with, and if I can help them by giving my recommendation, I do so with pleasure.

Yours very respectfully,

CAPT. B. F. REYNOLDS.

### RUNNING A BOAT 85 FEET LONG, 20 FOOT BEAM.

**THOMAS BARROW, EVANSVILLE. IND.**

Van Duzen Gas and Gasoline Engine Co., Cincinnati, O.

Gentlemen :—The gasoline engine which you put on my boat is giving entire satisfaction, especially the starting apparatus. I have been more than pleased with that, as it saves me the expense of a man, which is quite a saving. If this letter can be of any service to you in the way of recommending your gasoline engine, you have my consent to use same, and can refer any one you desire to me, as I heartily recommend your engine.

Yours respectfully, THOS. BARROW.

### RUNNING A FERRY BOAT.

**F. D. NELSON, ARLINGTON, OREGON.**

Van Duzen Gas and Gasoline Engine Co.

Gentlemen :—In rep y to your request, I take pleasure in stating that I am using the No. 8 engine I purchased of you some nine month ago, in a ferry boat 19 by 50 feet. The river at this place is 2,400 feet wide, at this stage of water, and the boat makes a trip both ways in from nine to twe ve minutes, according to load, at a cost for gasoliue of 4 to 6 cts., according to load.

I run this engine at a very high speed, 325 to 400 per minute, and it gives excellent power, and cheaper than any other power for my business.

Very truly yours, F. D. NELSON.

WE BUILD these engines for stationary purposes as well and have them in use in flour mills, shoe shops, printing offices, bakeries, paint works, blacksmith shops, creameries, as well as for cutting wood, grinding feed, cutting ensilage, etc., for farm purposes.

**Prices quoted and information furnished on application to the**

# Van Duzen Gas and Gasoline Engine Co.,

**208 E. Third Street, - - CINCINNATI, OHIO.**

WILLIAM L. BROWN, PRESIDENT. W. F. COBB, VICE-PRESIDENT. W. I. BABCOCK, MANAGER. O. R. SINCLAIR, SECRETARY.

# CHICAGO SHIP BUILDING COMPANY,

LONG DISTANCE TELEPHONES.
Ship Yard Office, "South Chicago 40."
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## STEEL STEAM-SHIP BUILDERS,

101st St. and Calumet River, SOUTH CHICAGO, ILL.

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## AMERICAN CHAIN CABLE WORKS.

ESTABLISHED 1865.

Cable, Dredge, Quarry, Shipping, Crane and Rafting

## CHAINS.

Our DREDGE and CRANE CHAINS are made of IRON ROLLED SPECIALLY for that purpose. Send for Price List

J. B. CARR & CO., Manufacturers, TROY, NEW YORK.

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## THOS. DREIN & SON, TATNALL AND RAILROAD STS., WILMINGTON, DEL.

Builders of Metallic Life Boats and Rafts, Yachts and Pleasure Boats. LifePreservers. Outfit for Lake Steamers a Specialty.

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## THE "CINCINNATI" AUTOMATIC STEAM STEERING GEAR

A Simple, Powerful Machine. Noiseless and Sure.

SEND FOR CIRCULAR.

CRAWLEY & JOHNSTON,
119-121-125 E. Pearl St., CINCINNATI, OHIO.

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GEORGE B. CARPENTER. ESTABLISHED 1840. BENJAMIN CARPENTER.

## GEO. B. CARPENTER & CO.

*Ship Chandlers and Sail Makers.*

CORDAGE, TWINES, COTTON DUCK,
MILL, RAILROAD and VESSEL SUPPLIES.

202, 204, 206, 208 So. WATER STREET,
CHICAGO, ILL.

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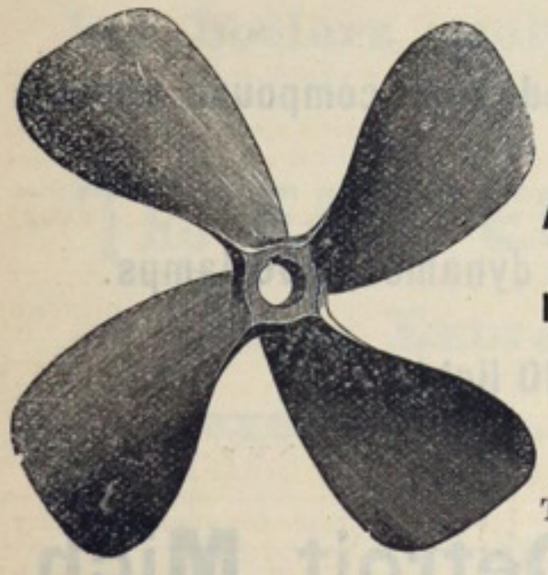
## H. G. TROUT, KING IRON WORKS,

BUFFALO, N. Y.,

MANUFACTURERS OF

TRIPLE EXPANSION, THREE CYLINDER, FORE AND AFT And STEEPLE COMPOUND MARINE ENGINES,



High and Low Pressure Engines, Sectional, Propeller. Tug and Yacht Wheels.

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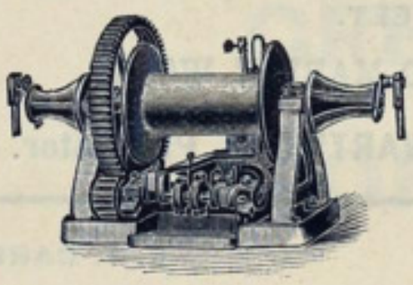

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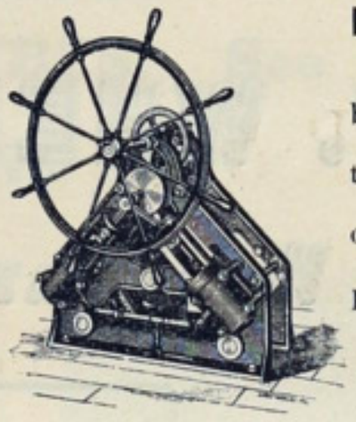

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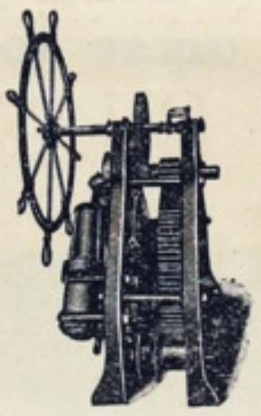

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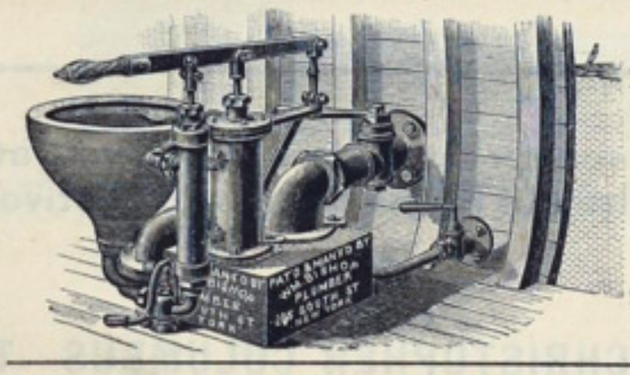

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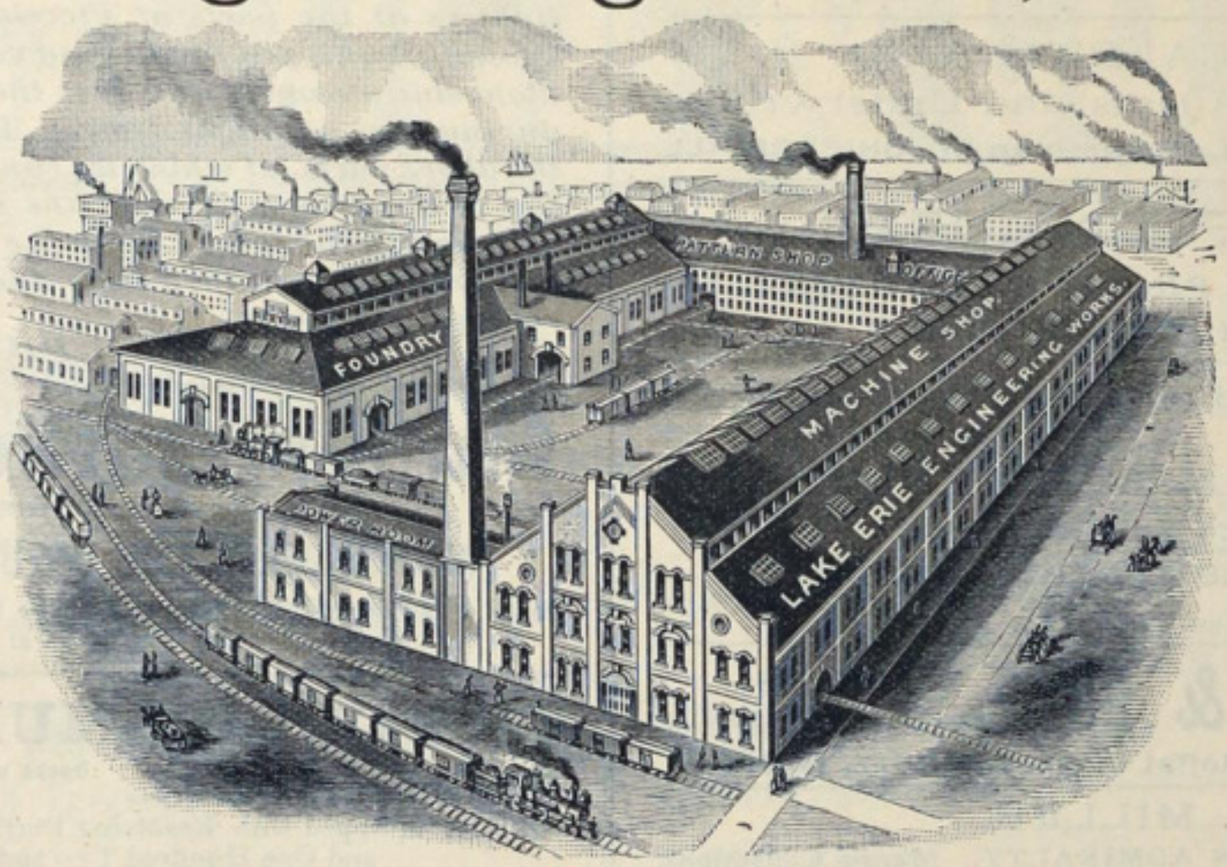


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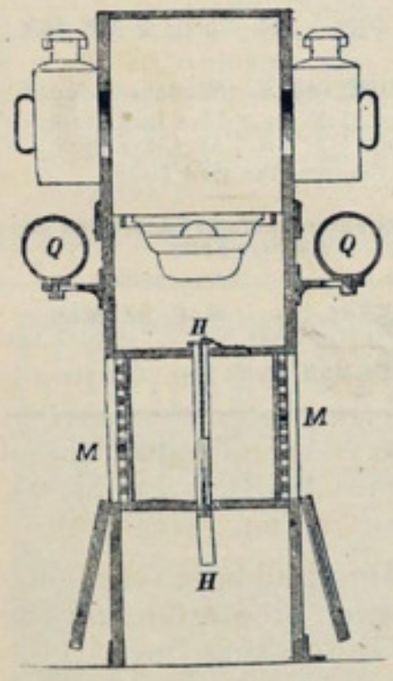

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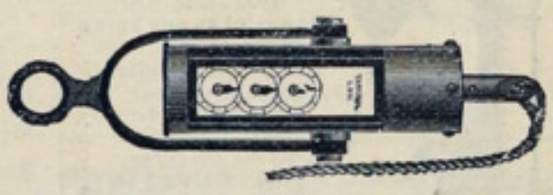

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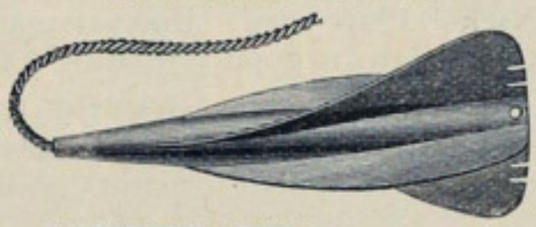

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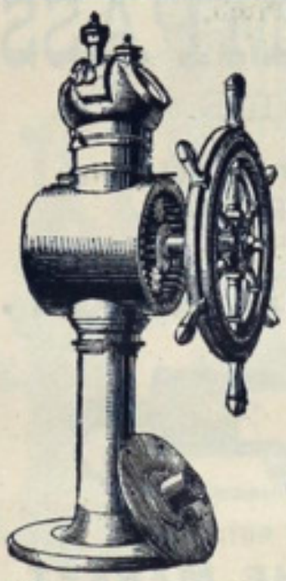

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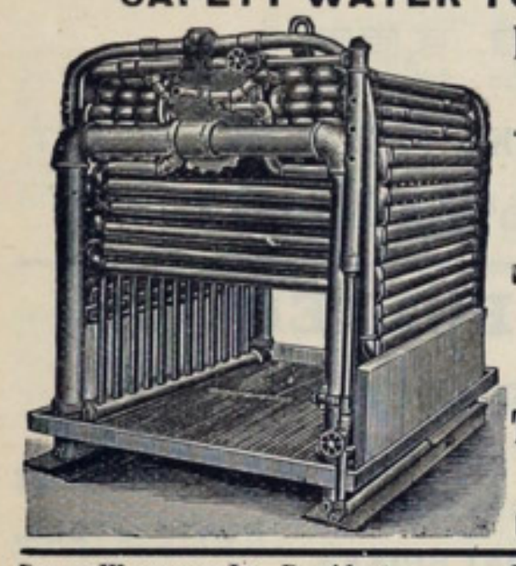

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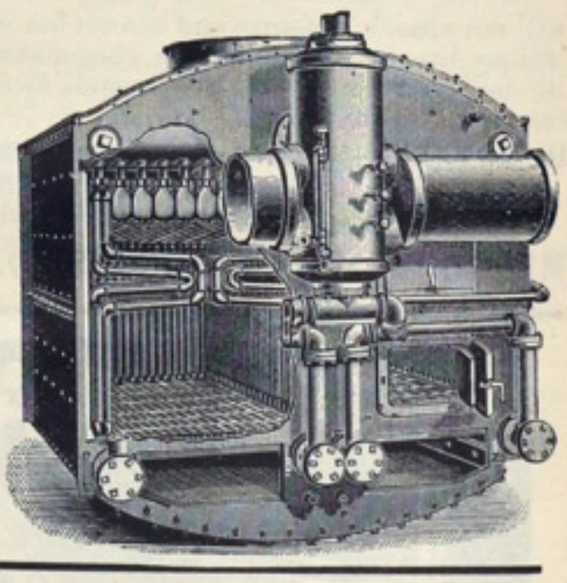

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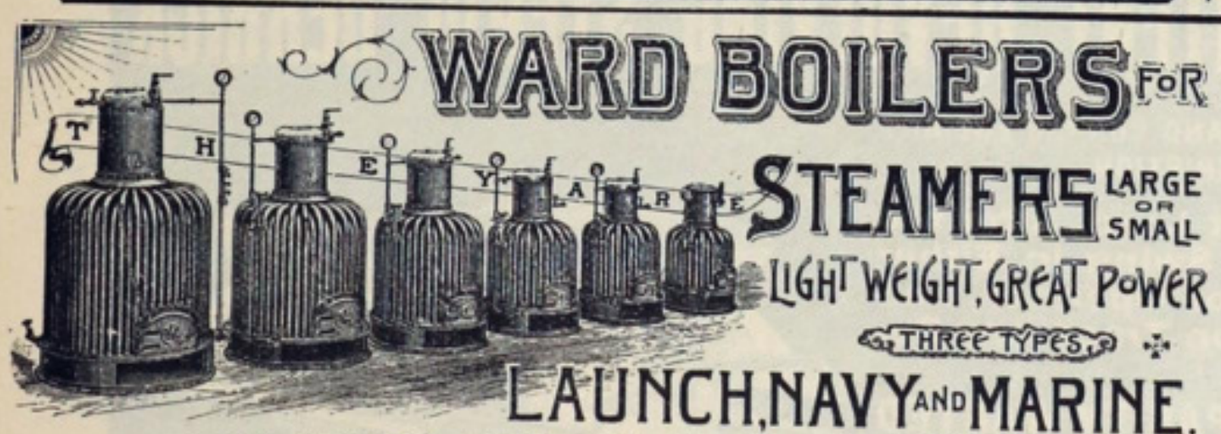

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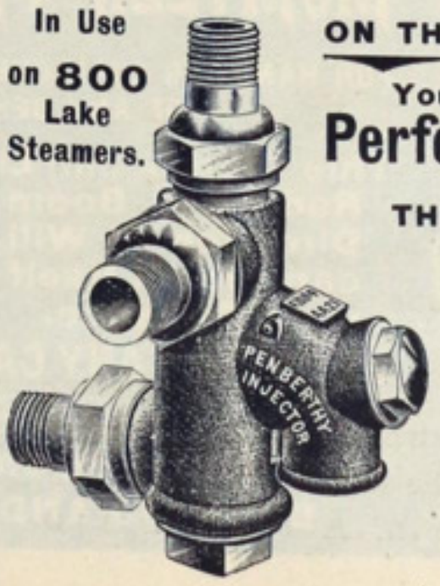


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